Food Technology Abstracts

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National Information Centre
for Food Science and Technology.
Central Food Technological
Research Institute, Mysore

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Food Technology Abstracts

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GENERAL

2038 KNORR (D). Quality of ecologically grown food. *Food Sci + Technol.* 12(6); 1979; 350-6

Ecologically grown food has been compared with conventionally grown food and some of the problems associated with such studies have been discussed. Some of the few, existing, long-term experiments show the superior nutritional quality of ecologically grown food (eco-food) as compared to products grown on mineral-fertilized soil. Present quality criteria such as yield, size, appearance and sensory quality are discussed, and some recommendations made for quality criteria more appropriate to eco-foods; some methods have been proposed for the determination of these new quality criteria. KMD

2039 MERRILL (RA). FDA and the effects of substantive rules. *Food Drug Cosmet. Law J.* 35(5); 1980; 270-82

2040 HUTT (PB). Food and drug regulation in transition. *Food Drug Cosmet. Law J.* 35(5); 1980; 283-99

2041 STIMSON (RA). FDA's standards policy. *Food Drug Cosmet Law J.* 35(5); 1980; 300-5

FOOD PROCESSING AND PACKAGING

PROCESSING

2042 MUKHOPADHYAY (TK). Food processing and its relevance to rural development. *Indian Food Packer.* 35(1); 1981; 31-8

Aspects discussed include: science, technology and food processing, present status of fruit and vegetable production and processing, development of food processing industry in India, structure of the industry; utilization of wastes from fruits and vegetables, interrelationship between the growth of food processing industry and rural development and suggestions for improvement. BSN

2043 DAVIS (HO), REMLINGER (WC) and WARNER (RC). Effective can warming and drying operations. *Bev. Food World.* 7(4); 1980; 35-7

2044 THIJSSEN (HAC). Optimization of process conditions during drying with regard to quality factors. *Food Sci + Technol.* 12(6); 1979; 308-17

2045 GUEGOV (J). General correlation between the cryoscopic temperature and the soluble solids content of fruit and vegetables. *J. Food Technol.* 15(6); 1980; 607-12

A regression relationship has been established reflecting the influence of soluble solids on the cryoscopic temperature value of fresh fruit and vegetables, regardless of their variety and species. The equation was found to compare well with experimental data from other studies. BSN

2046 ETZEL (MR) and KING (CJ). Retention of volatile components during freeze drying of substances containing emulsified oils. *J. Food Technol.* 15(6); 1980; 577-88

2047 WHITEHEAD (WK). Food processing wastes management. *Agric. Eng.* 61(8); 1980; 26-7

Three categories of pollution control methods are discussed: i) Inplant control (including water conservation); ii) pretreatment for discharge to a

municipal sewer system; and iii) full treatment for discharge to receiving stream. KAR

PACKAGING

2048 DAY (FT). The choice and application of wrapping papers. *Confect. Prod.* 46(6); 1980; 284-5

FOOD ENGINEERING AND EQUIPMENT

2049 AGARWAL (RS) and RAMA BHARGAVA. Numerical computation of flow and heat transfer from an enclosed rotating disc with suction and injection. *Def. Sci. J.* 30(2); 1980; 75-82

2050 BAL KRISHAN. Heat transfer between well stirred and quiescent fluids through a thick vertical plate. *Def. Sci. J.* 30(2); 1980; 63-8

2051 CHAUDHARY (RC) and GAUR (YN). Heat transfer for laminar flow through parallel porous disks. *Def. Sci. J.* 30(3); 1980; 153-9

2052 MELLOR (JD). Vacuum techniques in the food industry. *Food Technol. Aust.* 32(8); 1980; 397-401

This paper is concerned with the three important applications of vacuum techniques in the food industry; vacuum cooling, vacuum thawing and freeze-drying. KAR

2053 BEECH (GA) and CRAFTS-LIGHTY (AL). Energy use in flour production. *J. Sci. Food Agric.* 31(8); 1980; 830-8

In UK, the primary energy required to provide the fuel and power in milling averaged 1.16 GJ t^{-1} flour. Electricity which accounted for 80% of this value was the sole energy used directly in the milling process. Electricity consumption per tonne of flour showed no significant variation between a soft grist and a hard grist. KAR

2054 SONWALKAR (N). Economical system for solar energy utilization. *Invent. Intell.* 15(6); 1980; 244-7

2055 SHARMA (UP). Complete recycling of cattle-shed wastes through biogas plant. *Bev. Food World.* 7(4); 1980; 48,50-1,68

EQUIPMENT

2056 GHODGAONKAR (AM). Colorimetric instrumentation. *Instrum. Bull.* 1(2); 1980; 13-6

2057 ANON. Scanning electron microscope. *Instrum. Bull.* 1(1); 1980; 5-6

2058 PANSARE (AK). Techniques of particle size analysis. *Instrum. Bull.* 1(2); 1980; 2-10

2059 KATTI (PK). Indian instrument industry I : A perspective. *Instrum. Bull.* 1(1); 1980; 7-13

2060 RAMAKRISHNA RAO (R). Regional Instrumentation Centre at Indian Institute of Science, Bangalore. *Instrum. Bull.* 1(1); 1980; 19-22

FOOD CHEMISTRY AND ANALYSIS

2061 NICHOLS (JA) and WOODRIFF (R). Coprecipitation of heavy metals directly in graphite crucibles for furnace atomic absorption spectrometry. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 500-5

2062 BJARN (O-C). Kjel-Foss automatic analysis using an antimony-based catalyst: Collaborative study. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 657-63

2063 WOIDICH (H) and PFANNHAVSER (W). Determination of antimony in biological materials and environmental samples by means of atomic absorption spectrophotometry. *Nahrung.* 24(4/5); 1980; 367-71 (German)

Preliminary analyses of food, carried out by means of atomic absorption spectrophotometry (wet digestion with a mixture of HNO_3, H_2SO_4 and $HClO_4$; formation of SbH_3 with the aid of $NaBH_4$) revealed antimony contents, which lie in the lower ppb range. Higher amounts (upto 138 ppb in beans) were found only in herbteas and pulses. KMD

2064 THIEX (N). Solvent extraction and flameless atomic absorption determination of arsenic in biological materials. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 496-9

2065 JACKSON (FJ), READ (JI) and LUCAS (BE). Determination of total chromium, cobalt and silver in foodstuffs by flame atomic-absorption spectrophotometry. *Analyst.* 105(1249); 1980; 359-70

A method is described for the determination of total chromium, cobalt and silver in foodstuffs. Organic matter is destroyed by a wet-digestion procedure and the cobalt and silver are concentrated by chelation with diethyl-ammonium diethyldithiocarbamate and extraction into 4-methylpentan-2-one, Chromium is then chelated with pentane-2,4-dione and separately extracted into 4-methylpentan-2-one. The concentrations of the three elements in the extracts are measured by flame atomic-absorption spectrophotometry. AA

2066 MOXON (RED) and DIXON (EJ). Semi-automatic method for the determination of total iodine in food. *Analyst.* 105(1249); 1980; 344-52

A simple method for the determination of total iodine in food, based on the catalytic destruction of thiocyanate by nitrite in the presence of iodide, has been evaluated and the colorimetric finish technique automated. Optimum conditions for the destruction of organic matter and the liberation of iodine have been investigated and a set of conditions applicable to the automated finish technique developed. The method, when applied to 160 foods, had a precision of about 10%, a detection limit for iodine of 1 µg per 100 g of food, a mean recovery of added iodide of 90% and an output of about 70 samples per week. The effect of storage conditions on the iodine content of fish and eggs has also been examined, and the effect of some possible interfering substances, such as chloride, bromide and mercury, investigated. AA

2067 HOLAK (W). Analysis of foods for lead, cadmium, copper, zinc, arsenic and selenium, using closed system sample digestion: Collaborative study. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 485-95

2068 MANTHEY (G) and BERGE (H). Method for the differential determination of inorganic and organic mercury in foods, water and biological materials. *Nahrung.* 24(4/5); 1980; 413-21 (German)

The authors describe a rapid and easy method for determining inorganic and organic mercury in foods, biological materials and water, requiring no preliminary oxidative digestion. The determination was performed by non-flame atomic absorption spectrophotometry, after enrichment on gold wool by means of a specially constructed device. The liberation of the Hg vapour from the sample suspension is achieved with the aid of different reaction solutions (for inorganic, and total mercury, respectively) in a strongly alkaline medium, using a modified stannite procedure. The method is also suited for the determination of inorganic and total mercury in dietary fats and high fat foods. AA

2069 WENZEL (K). The HPLC determination of elemental sulfur in foodstuffs. *Z. Lebensmittel-Unters. Forsch.* 170(1); 1980; 5-6

A simple HPLC method for the determination of sulfur is described. Sulfur is extracted from foodstuffs with petroleum ether, separated by means of HPLC and measured at 263 or 254 nm. AA

2070 ROACH (JA), SPHON (JA), HUNT (DF) and CROW (FW). Pulsed positive ion-negative ion chemical ionization mass spectrometry of animal drugs sulfonamides. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 452-9

2071 RAGHEB (HS). Some factors affecting assay variability in the determination of chlorotetracycline in premix feeds. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 448-51

2072 MILER (K) and CHOMIAK (D). An attempt at correlating antioxidative activity of phenolic compounds and energy of their aryl-hydroxyl bonds. *Acta Aliment. Pol.* 5(1); 1979; 49-59

2073 THIBAULT (JF). An automated method for the determination of pectic substances. *Food Sci + Technol.* 12(5); 1979; 247-51 (French)

The meta-hydroxydiphenyl method for determination of uronic acid has been automated and applied for the analysis of pectic substances. The influence of heating time, temperature and reagent concentration were studied. This automatic method allows the determination of 15 previously deesterified pectin samples per hour; the interference risks are very low. AA

2074 HABIB (A-AM) and SALEH (M-RI). Difference spectrophotometric method for estimation of balsamic acids in presence of resin acids. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 559-64

The acidic vs. alkaline difference spectra of cinnamic acid, benzoic acid, and total resin acids of tolu, benzoin and colophony were studied. characteristic maxima, minima and isosbestic points of these spectra led to the development of a method for the quantitation of the individual balsamic acids and complete elimination of the spectral interference due to resin acids. AA

2075 GIMENO (A). Modification of official method for analysis of carotenes and xanthophylls in dried plant materials and mixed feeds. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 653-6

2076 WREEDE (I-de) and STEGEMANN (H). Determination of proteins in SDS containing samples by the Biuret method. *Z. Lebensmittel-Unters. Forsch.* 170(1); 1980; 14-6 (German)

A fast determination of proteins in the presence of SDS (Sodium Dodecyl Sulfate) and after evaporation of ME (Mercaptoethanol) is given for solubilized

samples e.g. heat-denatured proteins. Phenols do not interfere. AA

2077 PRIOR (BA). Measurement of water activity in foods : A review. *J. Food Prot.* 42(8); 1979; 668-74

Water activity can be determined by (a) measuring the freezing-point depression of a liquid, or (b) measuring the equilibrium relative humidity of a solid or liquid. The methods that require only simple laboratory apparatus have a limited range of measurement and require long equilibration times. Among them, the water sorption isotherm method is reported to be the most accurate. The advantages of methods requiring specialized apparatus are that the water activity of the sample can be more rapidly determined, fewer manipulations are necessary and measurements can be made over a wider range. The electric hygrometer, the dew point hygrometer, and vapour pressure manometer are reported to have good accuracy. Some methods are unsuitable to test foods containing volatiles or excessive numbers of micro-organisms. KMD

FOOD MICROBIOLOGY

YEAST

2078 OURA (E), HAARASILTA (S) and LONDESBOROUGH (J). Carbon dioxide fixation by Baker's yeast in a variety of growth conditions. *J. Gen. Microbiol.* 118(1); 1980; 51-8

MUSHROOM

2079 DESHPANDE (AG) and TAMHANE (DV). Studies on dehydration of mushrooms (*Volvariella volvacea*). *J. Food Sci. Technol. (India).* 18(3); 1981; 96-101

Volvariella volvacea mushrooms were pretreated separately with boiling water for 0-3 minute steam for 0-7 minute and with SO_2 (0-2000 p.p.m.) to inactivate polyphenoloxidase (PPO) before dehydration. Steam blanching for 7 minute or 2000 p.p.m. SO_2 treatment completely inactivated the PPO and the SO_2 treatment was found superior to steam treatment. Drying was done using fludised bed dryer and tray dryer with 60 to 80 C drying temperature and 90 to 270 minute drying time to reduce the moisture around 5-9%. An acceptable product was obtained in 90 minute when dried in a fluidised bed dryer at 80 C with 7 kg batches; the dehydration ratio was 11.28 and the final moisture content of the product was 5.5%. Rehydration ratio was 5.7. Mushrooms were stored at 37 C and 25 C and 20-80% RH for 60 days and were assessed for quality at 15 days interval. Dehydrated mushroom stored at <60% RH and 25 C were acceptable for 2 months. KAR

2080 PURKAYASTHA (RP) and NAYAK (D). Analysis of protein patterns of an edible mushroom by gel-electrophoresis and its amino acid composition. *J. Food Sci. Technol. (India).* 18(3); 1981; 89-91

Mature fruit-bodies (MF) of *Calocybe indica*, an edible white mushroom contain greater amount (17.21%) of protein than the buttons (15.07%) on dry weight basis. Gel electrophoretic analysis of soluble proteins of fruit bodies at developmental stages revealed that 20, 18 and 16 protein bands are present in button (B), stipe with well differentiated pileus (SWP) and stipe with tiny pileus (SP), respectively. MF also showed 18 protein bands. Six to seven unique bands usually occur in B. SP and MF but only 3 have been detected in SWP.

Certain bands which appear in one stage disappear in subsequent stages, while others remain unaltered. Chromatographic analysis of fruit-body protein shows that *C. indica* contains 12 amino acids and one amide. Glycine seems to be the predominant one. AA

2081 VAROQUAUX (P) and SARRISS (J). Influence of ascorbic acid on the kinetics of the O-diphenoloxidase (E.C.1.14.18.1) of the Parisian mushroom (*Agaricus bisporus*). *Food Sci + Technol.* 12(6); 1979; 318-20 (French)

A semi-automatic spectrophotometric method was employed to determine the kinetics of the o-diphenolaxidase reaction, as influenced by ascorbic acid. The latter does not have a direct action on the enzymatic activity. Equations that describe the kinetics of the reaction have been derived from the experimental results. It is concluded that ascorbic acid neither activates nor inhibits this enzyme. KMD

FOOD ADDITIVES

2082 KRUKAR (RJ). Flavours and colours in extruded snack foods. *Cereal. Food World.* 25(9); 1980; 596-8

After discussing the high pressure and low pressure cooking extrusion, the author gives an account of the use of colour and fading of colour in extrusion products. KAR

2083 HAVSTEEN (B). Biochemical effects of flavonoids. *Z. Lebensmittel-Unters. Forsch.* 170(1); 1980; 36-41

The flavonoids form a class of substances that are found in all photosynthesizing plants and microorganisms. In this article the biochemical effects of the flavonoids are reviewed. Those of the biochemical effects of the flavonoids that have so far been recognized may be described as those exhibiting enzyme inhibition, membrane activation and protection against autooxidation. The curative effects of flavonoids should probably be interpreted as the results of the above mentioned effects. The diseases that are treated with flavonoids include: neoplastic diseases (cancer), diseases of the connective tissue, infections, hereditary diseases and nervous diseases. KMD

2084 TOYODA (M), ITO (Y) and IWAIDA (M). Fluorescence in candies caused by methyl anthranilate, a flavouring agent. *J. Food Prot.* 42(8); 1979; 658-9

The fluorescent substance found in imported fruit candy was identified as methyl anthranilate which occurs in grape flavour preparations. Methyl anthranilate contents in the candy and grape flavour were estimated by gas chromatography at 40.0 and 33,000 ppm, respectively; it was calculated that the addition level of grape flavour to the candy was about 0.12%. KMD

2085 FRIEDRICH (H) and GUBLER (BA). Interactions between flavouring substances and food components. III. Influence of the dissolution medium on the flavour instability of citral. *Food Sci + Technol.* 12(5); 1979; 281-3 (German)

Citral, which makes up 2-4% of a cold pressed, lemon peel oil, is rather unstable when used by itself, to provide a lemon flavour to a food. But when it is a part of lemon peel oil, it is much more stable than isolated citral. The monoterpene hydrocarbon d-limonene showed the same stabilizing effect on citral as the total lemon oil. Application of these findings to food flavourings has only a limited scope as d-limonene is only poorly soluble in water. Furthermore, d-limonene is very sensitive to oxidation and forms unpleasant smelling degradation products. KMD

SORBITOL

2086 DOKLADALOVA (J), BARTON (AY) and MACKENZIE (EA). High pressure liquid chromatographic determination of sorbitol in bulk sorbitol. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 664-6

SWEETENING AGENT

2087 HOPPE (K) and GASSMANN (B). New aspects of the evaluation of the sweetening power and of the use of sweetening agents. *Nahrung.* 24(4/5); 1980; 423-31 (German)

The sweetening power of sweetening agents and factors influencing mixtures of sweetening agents are discussed. A scale for sweetness intensity has been introduced. This scale makes an absolute evaluation possible The powderables and impowderables of sugar exchange in foods are indicated. The sweetening power depends on the concentration and it expresses the intensity of the sensitivity to sweetness as compared to a reference substance (saccharose solution). Apart from the concentration, the temperature of consumption may exert a considerable effect on the sweetness of sweetening agents. KMD

2088 UNTERHALT (B) and GHORI (M). Oximes as artificial sweeteners. *Z. Lebensmittel-Unters. Forsch.* 170(1); 1980; 34-5 (German)

5-thia-1-cyclohexene-1-carboxaldehyde oxime 7, its 4,6-dimethyl-derivate 8 and 5-oxa-1-cyclohexene-1-carboxaldehyde oxime 9 were synthesized. In comparing these with the sweet tasting 1-cyclohexene-1-carboxaldehyde oxime 4, it was found that only 7 is slightly sweet. AA

COLOURS

2089 MEGGOS (HN). Nonabsorbable food colours. *Cereal Food World.* 25(10); 1980;650-1

A brief review covering the early work done and establishment of the non-absorbability of colours, along with this stability tests and applications. KAR

2090 BAILEY (JE). High pressure liquid chromatographic determination of intermediates and subsidiary colors in FD&C Blue No.2. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 565-71

2091 BRAMMELL (WS). Potentiometric titration methods for the determination of sodium chloride in certifiable water soluble colors; Collaborative study. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 572-80

CEREALS

2092 HUNSTON (MJ). Infra-red analysis: quality control of the future. *Food Flavour Ingred. Packag. Process.* 2(2); 1980; 24-5,27

Discusses : near infra-red analysis; advantages; CGA model 101 (cereal grain analyser); GQA model 31EL; FQA model 51A; 6000 series research analyser; 6350 research composition analyser and model 410 on-line composition analyser. BSN

2093 OHMS (J-P). Electrophoretic differentiation between varieties of grain cultivars. *Z. Lebensmittel-Unters. Forsch.* 170(1); 1980; 27-30

Cultivar specific protein patterns are observed after disc-electrophoresis of wheat proteins soluble in buffer. Reduction of protein extracts by 2-mercaptoethanol induces the formation of six additional protein bands. Two of these 2-mercaptoethanol dependent bands occur preferentially in cultivars with good baking quality (A-baking quality); these specific protein patterns are found in 61% of all German wheat cultivars with A-baking quality and only in one cultivar with A- baking quality. The suitability of these two bands for the general recognition of cultivars with A-baking quality in commercial wheat samples is discussed. AA

2094 WIESER (H), SEILMEIER (W) and BELITZ (H-D). Comparative investigations of partial amino acid sequences of prolamines and glutelins from cereals. 1. Fractionation of proteins according to osborne. *Z. Lebensmittel-Unters. Forsch.* 170(1); 1980; 17-26

Albumins, globulins and prolamines of wheat, rye, barley, oats, rice, sorghum and maize were obtained by extraction of defatted meals successively with water, salt solution and aqueous ethanol. The residual proteins were taken as glutelins. The cereals contain very different amounts of the four protein fractions mentioned. The amino acid composition of the prolamines only is correlated with the phylogenetic relationships. With the cereals causing coeliac disease (wheat, rye, barley) the amino acid composition of the prolamines is very similar and strongly different from that of the other cereals. The differences between wheat and other cereals in respect to gluten formation is reflected very well by the amounts and amino acid compositions of prolamines and glutelins. AA

2095 OCKER (H-D) and SEIBEL (W). Residue problems with grain and bread. Part I. Pesticide residues. *Getreide Mehl Brot.* 34(1); 1980; 22-5 (German)

Since many years the German grain harvest (wheat and rye) is being examined regularly for residues of pesticides and other harmful substances e.g. toxic heavy metals. Of late, the residues of hydrogen chloride pesticides, such as Lindan, HCB, DDT, etc., have decreased considerably. But some residues, especially of Lindan, can be detected in many samples. Since 1976, the tolerance limits have not been exceeded in the bread grain harvest the pesticide residues in bread were found to occur with in same frequency and concentration as in the case of grain. Histograms illustrate that the pesticide content of bread is derived from the bread grain and its products. Other sources of contamination (storage of the grain, contaminated imported grain, baking, ingredients) are involved only in special cases. KMD

2096 SIMMONDS (DH). Cereal quality and its role in grain marketing. *Food Technol. Aust.* 32(8); 1980; 402-10

The article covers segregation into grades, quality attributes of wheat, quality testing procedures, insect detection and grain storage, sampling and quality control in some other crops like rice, barley, etc. KAR

PADDY

2097 VASAN (BS), VENKATESAN (V) and PILLAIYAR (P). Soil-salt mixture for preserving wet paddy. *J. Food Sci. Technol. (India).* 18(3); 1981; 120-2

River/sea sand, soil and soil-salt mixture were used to preserve wet paddy (18.5-20.5% moisture). Except soil-salt mixture others did not control sprouting, infection and heating in paddy. Soil-salt mixture to paddy ratio levels of 0.25:1 to 1:1 so as to get 2,3,4 and 5% of salt on the weight of paddy were

used to find out the optimum level. A salt-soil (or soil to sand in equal proportion) mixture with wet paddy in the ratio of 0.75:1 (which is equal to 5% of salt by the weight of paddy) preserved paddy without fungal infection or development of heat for 10 days. Paddy variety Co 25 and IR 20 with 25.5 and 23% moisture when treated with soil-salt mixture (salt being 5% on the weight of paddy) and stored for 20 days gave 5% increased brown rice yield than the untreated paddy. KAR

RICE

098 ANGERMANN (A). Hydrothermic treatment in polishing mills. *Getreide Mehl Brot.* 34(1); 1980; 3-6 (German)

The hydrothermic treatment (parboiling) in polishing mills has various functions. Contrary to earlier aims such as the improvement of the durability and easier shelling and polishing, today the main aim in the case of hydrothermic treatment of rice is preservation of nutrient foodstuffs, which would be lost during the polishing of brown rice (cargo) to white rice. It is a question of vitamins and minerals. In hydrothermic treatment of barley one aims at a similar result with a process similar to the one used for rice. In contrast, the main function of the hydrothermic treatment of oats is loosening of the shell and stabilization of the fat by inactivating the enzymes. The taste, too, is influenced positively. KMD

WHEAT

099 POLLHAMER (S). Environmental factors and changes in wheat quality. *Getreide Mehl Brot.* 34(1); 1980; 1-3 (German)

The results show that the authors' standard baking test is very suitable for determining the influences of environmental factors on the baking of bread The permanent use of the same method makes it possible to recognise the qualitative changes in wheat at the right time. KMD

100 BOLLING (H) and MUNZING (K). Use of the SDS-sedimentation test for the evaluation of bread wheat. *Getreide Mehl Brot.* 34(1); 1980; 6-11 (German)

The sedimentation method developed in Great Britain for the evaluation of bread wheat, in which sodium dodecyl sulfate (SDS) is used, is expected to replace the Zeleny sedimentation test on account of its simpler practicability and reliable results. But studies on inland wheats of different origin and quality showed that the advantages of SDS sedimentation could not be confirmed. A relative good correlation to baking quality could be obtained on English test material. With regard to practicability, the SDS sedimentation method required a more time and labour than the Zeleny sedimentation. The results of the experiments, carried out show that the SDS method is not suitable for an evaluation of indigenous (i.e. W. German) bread wheat and cannot replace the Zeleny method. KMD

2101 KOETZ (R), AMADO (R) and NEUKOM (H). Nature of the bound nicotinic acid in wheat bran. *Food Sci + Technol.* 12(6); 1979; 346-9

Bound nicotinic acid was found to be distributed over all the fractions of wheat bran, including bran lipids. A watersoluble, high-molecular-weight fraction, viz. non-dialyzable nicotinic acid (NDN), was isolated and analyzed. It consisted mostly of polysaccharide material, with arabinose, glucose, galactose and xylose dominating, and contained 10.5 mg/g of bound nicotinic acid. Partial acid hydrolysis yielded a fragment which was identical with synthetic 3-O-nicotinoyl-D-glucose. Nicotinic acid in the NDN is bound predominantly to

the glucose component of polysaccharides or glycoproteins. Some isomerization of the nicotinoyl-glucose during acid treatment was observed. KMD

2102 LEGOUAR (M), COUPRIE (J) and GODON (B). Behaviour of protein components in mixtures of wheat flours or of somewheat flour fractions. *Food Sci + Technol.* 12(5); 1979; 266-72

A study of the improving power of the protein fractions of strong wheats shows up the important role of acid-soluble glutenins, while the presence of acid-insoluble glutenins accounts for their baking value. Some properties of acid-soluble glutenins have been examined and their importance of such glutenins has been confirmed. KMD

2103 WESTERMARCK-ROSENDAHL (C), JUNNILA (L) and KOIVISTOINEN (P). Efforts to improve the baking properties of sprout damaged wheat by reagents reducing α-amylase activity. I. Screening tests by the falling number method. *Food Sci + Technol.* 12(6); 1979; 321-4

The baking quality of sprouted wheat grain can be improved by reducing its α-amylase activity. The falling number of the reference material - i.e. sprouted grain - was 143. Silver nitrate (2 μeg/g) could improve this value to 327. Sodium phytate, trisodium phosphate and sodium monohydrogen phosphate, at concentrations of 2.5, 5.0 and 10.0 μeg/g meal, respectively, raised the value to 250. Hexafluorosilicate, sodium dodecyl sulphate and calcium stearoyl lactylate were all capable of raising the value to 200 and more. Citric acid and EDTA (disodium salt) also increased the falling number somewhat. The most promising α-amylase inhibitors to be used in bread-baking are, therefore, trisodium phosphate, disodium phosphate, sodium polyphosphate, sodium dodecyl sulphate, calcium stearoyl lactylate and citric acid. KMD

2104 CLOWER (M) Jr. Modification of the AOAC method for determination of fumigants in wheat. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 539-45

MILLETS

2105 HARROLD (RL), CRAIG (DL), NALEWAJA (JD) and NORTH (BB). Nutritive value of green or yellow foxtail, wild oats, wild buckwheat or redroot pigweed seed as determined with the rat. *J. Anim. Sci.* 51(1); 1980; 127-31

2106 NUNEZ (MA) and MAGA (JA). Comparison of iron availability using anemic rats in extruded and conventional flour. *Food Sci + Technol.* 12(5); 1979; 287-9

Biological availability of iron, in a Venezuelan pre-cooked refined flour and an extruded corn flour, was assessed using the hemoglobin repletion test on anemic rats. Biological value of iron used (ferrous fumarate) in both products was compared to that of ferrous sulfate, used as a standard. It was determined that ferrous fumarate was as efficient as ferrous sulfate for hemoglobin regeneration; however, the biological availability of iron in Venezuelan flour was higher than that in extruded flour. AA

MAIZE

2107 CICHOWICZ (SM) and BANDLER (R). Determination of *Geotrichum* mold in cream style corn: Collaborative study. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 481-2

2108 GUPTA (HO), LODHA (ML), MEHTA (SL), RASTOGI (DK) and JOGINDER SINGH. Changes in minerals, proteins and amino acids in hard endosperm opaque-2 Zea mays during development. *Indian J. Exp. Biol.* 18(12); 1980; 1419-22

During the development of the grains of modified opaque-2 maize, it was found that the albumin fraction decreased while the globulin, zein, and glutelin fractions increased. Modified Opaque-2 endosperm showed a greatly reduced zein synthesis, but a greater accumulation of minerals (K, P, Fe) than the normal maize endosperm. The rate of total protein accumulation was higher in modified Opaque-2 than in Opaque-2, while it was lower than in the normal maize endosperm. Thus, the composition of modified Opaque-2 maize appears to lie somewhere between the compositions of Opaque-2 and normal maize. KMD

2109 THEAN (JE), LORENZ (DR), WILSON (DM), RODGERS (K) and GUELDNER (RC). Extraction, cleanup and quantitative determination of aflatoxins in corn. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 631-3

PULSES

2110 CERNING-BEROARD (J) and FILIATRE VEREL (A). A comparison of the carbohydrate composition of smooth and wrinkled peas. *Food Sci + Technol.* 12(5); 1979; 273-80 (German)

Smooth peas were richer in starch than wrinkled peas (42.7-47.9% as compared to 26-32.9%); but the latter had higher contents of structural polysaccharides such as hemicelluloses and cellulose, soluble sugars and proteins. The α-galactosides found were verbascose, stachyose, raffinose and ajugose - in decreasing amounts. Most of the carbohydrates occur in the hulls (87%) and they are mostly made up of structural polysaccharides, lignin and pectic material. The cotyledons contain most of the starch. The cell-wall constituents yielded, on acid hydrolysis, mostly xylose, as well as smaller amounts of arabinose, glucose, galactose and traces of rhamnose. KMD

2111 RIZK (A-F) and WOOD (GE). Phytoalexins of leguminous plants. *CRC Crit. Rev. Food Sci. Nutr.* 13(3); 1980; 245-95

Discusses : green beans (Phaseollin (I); metabolic conversion of phaseollin, biosynthesis, toxicity, coumestrol (VII), phaseollidin (VIII), phaseollinisoflavan (II), kievitone (IX), 2-methoxyphasellinisoflavan (X), 1α-hydroxyphaseollone (III), genistein (XI), 2,4,5,7-tetrahydroxyisoflavone (XII)); garden pea (pisatin (XIII), metabolism, toxicity, biosynthesis, inermin (XV), 4-hydroxy-2,3,9-trimethoxy - pterocarpan (XVI), 3-hydroxy-2,9-dimethoxy-pterocarpan (XVII) and 2,3,9-trimethoxy-pterocarpan (XVIII)); soybean (glyceollin (XX)); broad bean (wyerone (XXIII), Wyerone acid (XXV));alfalfa (medicarpin (XXX), Sativan (XXXII) and other legumes (red clover, white clover, cowpea, sweet clover, other plants). BSN

CHICK PEA

2112 SINGH (U), RAJU (SM) and JAMBUNATHAN (R). Studies on Desi and Kabuli chickpea (*Cicer arietinum* L.) cultivars. II. Seed protein fractions and amino acid composition. *J. Food Sci. Technol. (India).* 18(3); 1981; 86-8

Seed protein fractions (albumin + globulin, glutelin and prolamin) and amino acid composition of 4 cultivars in each of Desi and Kabuli var. of chickpeas (*Cicer arietinum*) grown commonly in India were determined. Distribution of various classes of proteins was studied by using 3 different solvents and

the salt soluble proteins were characterized by sodium dodecyl sulphate-polyacrylamide gel electrophoresis. Very little difference was found between the cultivars of Desi and Kabuli types and it was not possible to distinguish these cultivars by the technique employed. (For Part I see Proc. Int. Workshop on Chick pea improvement, ICRISAT, Hyderabad, India, 1979). KAR

PIGEON PEA

2113 SINGH (U), JAMBUNATHAN (R) and SANTHOSH GURTU. Seed protein fractions and amino acid composition of some wild species of pigeon pea. *J. Food Sci. Technol. (India)*. 18(3); 1981; 83-5

Protein fractions and amino acid composition of (i) pigeon pea (*Cajanus cajan*) and (ii) eight related wild species belonging to subtribe Cajaninae were determined. The crude protein content in (ii) ranged from 28.3 to 30.5% whereas it was 24.2% in (i). Salt soluble proteins were characterized by SDS-polyacrylamide gel electrophoresis which revealed similarities in the major protein subunits in these species although the intensity of these subunits and other minor protein subunits varied. Considerable differences in the levels of lysine and S-amino acids were observed among the wild species. The wild species *Atylosia volubilis* contained maximum amount of lysine (7.48 g/16 gN) and phenylalanine (13.44 g/16 gN). S. amino acids were maximum in *Atylosia sericea*. KAR

OILSEEDS AND NUTS

CASTOR

2114 EL-SEBAIY (LA), EL-MAHDY (AR), MOUSTAFA (EK) and MOHAMED (MS). A modified method for the isolation and quantification of oil seed phospholipids. *Food Chem.* 5(3); 1980; 217-29

A modified method for the isolation and accurate quantification of oil seed phospholipids is described. Castor bean and sunflower were taken to represent seeds of high neutral lipid and low phospholipid content. Preparative thin layer chromatography (TLC) on silica gel was used for the separation of the phospholipid class from the total lipid extract which was prepared by a modified method. An eluant composed of methanol:acetic acid:water, 94:1:5, which gave 95 ± 3% phospholipid recovery was used. The phospholipids were fractionated by one dimensional TLC and identified by a series of colour reagents as well as by comparison with a natural reference which contained all the known phospholipid fractions and was prepared from rat liver. The fractionated phospholipids on TL chromatographic plates were quantified by phosphorus determination. AA

MUSTARD

2115 RAY (S), TALUKDER (G), SENGUPTA (KP) and CHATTERJEE (GC). Studies on fatty acid composition of serum lipids in rats fed mustard oil or groundnut oil containing diets. *Indian J. Exp. Biol.* 18(12); 1980; 1509-11

Rats fed for 150 days on a mustard oil containing diet showed a significant increase in their serum lipid content and an alteration in the fatty acid pattern, when compared to those fed on a diet containing groundnut oil. Erucic acid was found in the serum lipids, as in low density lipoprotein, and also in very low density lipoprotein. Changes of fatty acid pattern also were noted in the

serum lipoproteins of animals fed on the mustard oil. KMD

SAFFLOWER

2116 VIBHAKAR (S), RAJALAKSHMI (S), NAGARAJA (KV) and KAPUR (OP). Physico-chemical characteristics of safflower oil. *Indian Food Packer.* 35(1); 1981; 11-2

Safflower seed (*Carthamus tinctorius*) (5 varieties representing 4 cultivars) (i) Manjira, (ii) Annigeri-S, (iii) Annigeri-S-144, (iv) Nag-7 and (v) Tara were collected from three regions of India, and analysed for their oil characteristics ((a) B.R. Reading, (b) FFA, (c) iodine value and (d) Saponification value). The range of values reported were : (a) 62.5-64.5 at 40 C, (ii) 0.15-1.09% as oleic acid, (iii) 136.6-146.0 (Wij's method) and (iv) 186.0-195.0). These values were within the limits prescribed under Prevention of Food Adulteration Act, India. BSN

SOYABEAN

2117 KARAYIANNIS (NI), MacGREGOR (JT) and BJELDANES (LF). Biological effects of alkali-treated soya protein and lactalbumin in the rat and mouse. *Food Cosmet. Toxicol.* 17(6); 1979; 591-604

2118 BOBALIK (JM) and TARANTO (MV). The effect of enzymic modification on the foaming, water absorption and baking quality of defatted soya flour. *J. Food Technol.* 15(6); 1980; 637-46

Defatted soya flour slurries were treated for 0,5,10,15 and 30 minute with papain at 50 C and tested for whipability, water absorption and baking quality at replacement levels in wheat flour of 10,20 and 30% (w/w). When whipped, all modified suspensions showed volume increases exceeding 250% with lower stability ratings than the unmodified samples. The 30 minute enzyme treated product exhibited excellent water absorption. Use in bread resulted in depression of loaf volume, development of a granular texture, off-colour and flavour. As was expected, all favourable characteristics decreased upon increasing the percentage of soya product in the dough formulation. Loaf volumes of breads containing 10% modified soya flour (MSF) ranged from 444 to 527 cc; with 20% MSF between 374 and 428 cc, and with 30% MSF between 383 and 409 cc. Loaf volume of all wheat flour bread was 861 cc. Hunter colour difference meter readings indicated samples at all replacement levels, regardless of the enzyme modification time, exhibited higher levels of visual lightness than all wheat flour bread. All experimental breads exhibited a higher level of yellow tones and lower level of green tones compared to the all wheat flour bread. AA

SUNFLOWER

2119 ASSOGNA (A), PATRICELLI (A), SODINI (G) and EMMI (E). Factors affecting the extraction of chlorogenic acid from defatted sunflower meal. *Food Sci + Technol.* 12(5); 1979; 262-5

The rate of extraction of chlorogenic acid from defatted sunflower seed meal is appreciably influenced by the particle size and the n-hexane conent, but the influence of stirring speed is negligible. The extraction ratio and degree of solid imbibition are factors that control chlorogenic acid concentration at equilibrium. KMD

2120 PATHAK (DK) and SHUKLA (SD). Quantity and quality of pectin in sunflower at various stages of maturity. *J. Food Sci. Technol. (India).* 18(3); 1981; 116-7

Sunflower heads were analysed after 100 (prior to seed formations), 130 (seed formation), 160 (seed maturation) and 180 (harvest) days from sowing for weight, pectin yield, ash and methoxyl content. Pectin content increased upto 160 days and thereafter remained constant. The ash content and free acidity of pectin increased but methoxyl and anhydrouronic acid contents of pectins decreased with the maturity of sunflowers. Jelly grade increased upto 100 days and decreased thereafter. KAR

ARECANUT

2121 SHAHABUDDIN (S), RAMESH RAO (A) and MUSTAFA (AS). Effect of arecoline on the humoral and cell mediated immune responses in mice. *Indian J. Exp. Biol.* 18(12); 1980; 1493-4

In order to test whether arecoline - an alkaloid contained in the arecanut is the cause of oral cancer among chewers of "paan" (i.e. betel leaf with areca nuts, slaked lime, tobacco, etc.), its effect on antibody formation and delayed hypersensitivity skin response to three doses of bovine serum albumin has been evaluated. Inhibition of both humoral and cell-mediated immune responses were noted in the Swiss albino mice (8-10 week old) treated with arecoline, irrespective of the antigenic doses. KMD

COCONUT

2122 HARIGOPAL (U) and TONAPI (KV). Sun-drying of palm kernel. *Indian Food Packer.* 35(1); 1981; 29-30

Good quality candy can be prepared from palm (*Borassus flabellifer* Linn) by keeping the tender kernels in sugar syrup (40 Brix having 0.3% citric acid) followed by raising the Brix to 60°. The product may be gradually dried at 66 C in a solar drier made of 20 gauge G.I sheet with thermocole insulation of 50 mm thickness of five sides while the sixth side or top has a jacketted cover of 3 mm thick glass. The dried candy will be white, sweet and of soft texture. No significant changes in colour, taste, flavour and appearance were observed during storage at room temperature for 1 year when dried candy was stored in bottles. BSN

TUBERS AND VEGETABLES

2123 BARTNIK (MS). Effect of climatic and soil factors on mineral composition of vegetables. III. Effect of climatic and soil factors on the contents of certain microelements in vegetables. *Acta Aliment. Pol.* 5(1); 1979; 3-13

The contents of Fe, Zn, Mn and Cu were determined in samples of cabbage, carrots, beets and onions, grown in four different horticultural regions, in three successive years and an attempt was made to establish correlations between the contents of these minerals in the vegetables on the one hand and the mineral content of the soil and soil acidity on the other. The Zn and Mn contents of the vegetables increased noticeably with soil acidity. No effects of temperature, precipitation and sunshine intensity were noticed. KMD

ONION

2124 MAZZA (G) and LeMAGUER (M). Volatiles retention during the dehydration of onion (*Allium cepa* L). *Food Sci + Technol.* 12(6); 1979; 333-7

2125 SHANKARANARAYANA (ML), ABRAHAM (KO), RAGHAVAN (B) and NATARAJAN (CP). Determination of flavour strength in alliums (onion and garlic). *Indian Food Packer.* 35(1); 1981; 3-8

The method consists in the oxidation of the steam distillate of onion/garlic samples (about 25 g onion or 5 g garlic) calculating the chloramine-T consumption and the % oil content. The consumption of N chloramine - T/g of onion and garlic was found to be 84 and 90 ml respectively. BSN

BEET

2126 JARZEBINSKI (J), FITAK (B), GAJEWSKA (M), DREWNOWSKA (W), KOZLOWSKA (H) and WALERIAN CZYK (E). Extract and determination of free amino acids and amids in sugar beets. *Acta Aliment. Pol.* 5(1); 1979; 15-20

Studies concerning different methods of extraction of aminoacids from sugar beets were carried out. The aminoacids, including asparagine and glutamie were separated and determined in an automatic analyzer. Correlation coefficients for each method were arried at. Norleucine was used as the internal standard. AA

CARROT

2127 KIRTSCHEV (NA) and KRATCHANOV (Chr.G). On the pectins of certain varieties of "*Daucus carota*". *Z. Lebensmittel-Unters. Forsch.* 170(1); 1980; 31-3 (German)

The pectin content of three varieties of carrots (Nantes-3, Pobeditel-4 and Gross karotel) was investigated. Various extractants were tested and it was found that a 0.5% solution of ammonium oxalate gave the highest yield and purity. Thirty minutes extraction at 85 C was the optimum condition. It was shown that the pectin of carrots was medium esterified (degree of esterification of Ca 60%) and was similar to citrus pectin in chemical and technological properties. The pectin preparations obtained were characterized by the following indices, degree of esterification, purity, viscosity number and gelling power. AA

TAPIOCA

2128 OGUNSUA (AO). Changes in some chemical constituents during the fermentation of cassava tubers (*Manihot esculenta crantz*). *Food Chem.* 5(3); 1980; 249-55

NO cyanide residue was detected in gari (a fermented product of Nigeria) although some low levels of cyanide were detected in lafum. Longer fermentation time and higher degree of heat treatment overcomes cyanide problem. KAR

LEAFY VEGETABLE

2129 AJAYI (SO), ODERINDE (SF) and OSIBANJO (O). Vitamin C losses in cooked fresh leafy vegetables. *Food Chem.* 5(3); 1980; 243-7

Vitamin C losses in *Amaranthus hybridus*, *Celocia argentea*, *Corchorus olitorus*, *Hibiscus esculentus*, *Solanum* species and *Talinum triangulare* were determined in fresh and blanched (Fafunso and Bassir, 1977 method) form. The total vitamin C losses ranged from 62.2 to 93.1%. Dehydroascorbic acid accounted for 3.4 to 19.4% of the total vitamin C left in blanched leaves. During the blanching of vegetables, enzymic oxidation of vitamin C is more important than non-enzymic oxidation by oxygen, catalysed by traces of metals such as copper and iron. KAR

KILKEERAI

2130 ROOPA (KA) and JAMUNA RANI RAO. Analysis of nutritional composition of Kilkeerai-greens (*Amaranthus tricolor*). *Arogya*. 6(2); 1980; 133-6

Kilkeerai (*Amaranthus tricolor*) 100 g of leaves contain 55% edible portion, 88.79 mois, 1.1 g crude fibre, 3 g of total ash, 779, 73 and 15.5 mg respectively of calcium, phosphorus and iron, besides 22.1 mg carotene. BSN

ALFALFA

2131 GURUMUKH SINGH and NARENDRA SINGH. Pigments and nitrogen in precipitated leaf proteins from lucerne (*Medicago sativa*). *Indian Food Packer*. 35(1); 1981; 27-8

Distribution of pigments and N during preparation of lucerne leaf protein concentrate (LPC) by different methods was studied. The solvents precipitated more N than either heat or acid, and among themselves followed the order acetone > isopropanol > ethanol. The residual pigments in solvent-precipitated LPCs also varied, with acetone-LPC having the lowest amounts and the ethanol one higher than the iso-propanol-LPC. AA

2132 HEGSTED (M) and LINKSWILER (HM). Protein quality of high and low saponin alfalfa protein concentrate. *J. Sci. Food Agric.* 31(8); 1980; 777-81

The effects of saponin content, methionine content and digestibility on protein quality were evaluated by chemical analyses and by rat bioassay. The low saponin alfalfa protein concentrate had a higher crude protein content, a higher protein digestibility, a higher relative nutritive value and higher protein efficiency ratios at all levels of added methionine than the high saponin APC. With addition of 0.3% methionine the protein quality of the low saponin APC was as good as casein. KAR

2133 WIEGHART (M), THOMAS (JW) and TESAR (MB). Hastening drying rate of cut alfalfa with chemical treatment. *J. Anim. Sci.* 51(1); 1980; 1-9

BRUSSELS SPROUT

2134 HEANEY (RK) and FENWICK (GR). Glucosinolates in *Brassica* vegetables. Analysis of 22 varieties of Brussels sprout (*Brassica oleracea* variety *gemmifera*). *J. Sci. Food Agric.* 31(8); 1980; 785-93

The major glucosinolates in Brussels leaf material which was higher than the reported values by other workers were identified as gluconapin, progoitrin, sinigrin and glucobrassicin with the latter two generally predominating. KAR

CAULIFLOWER

135 BHUPINDER KAUR AND SINGH (Y). Effect of dehydration and storage of cauliflower (*Brassica oleracea* var. *botrytis*) on the physical characteristics. *Indian Food Packer.* 35(1); 1981; 23-6

Cauliflower (*Brassica oleracea* variety *botrytis*) subjected to blanching with 0.6% sodium bisulphite solution for 5 minute in boiling water and dehydrated at 60 C in a tray drier was packed in (i) high density polyethylene bags (500 guage) and (ii) Al foil laminated bags and stored for six months was assessed for (a) reconstitution time (b) reconstitution ratio (c) colour (d) texture (e) flavour and (f) overall acceptability. Cauliflower in (i) or (ii) may be preserved for six months in a satisfactory condition ((a) 7-8 minute (b) 1:4.02-1:4.06, (c) white yellow head with light green stem, (d) soft, (e) good flavour and (f) good and very much in acceptable range) as compared to unsulphited control which showed browning and became unfit at the end of 4 months. BSN

TOMATO

136 SCOTT (PM) and KANHERE (SR). Liquid chromatographic determination of tenuazonic acids in tomato paste. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 612-21

FRUITS

STRAWBERRY

2137 McWEENY (DJ), SHEPHERD (MJ) and BATES (ML). Physical loss and chemical reactions of SO_2 in strawberry jam production. *J. Food Technol.* 15(6); 1980; 613-7

Strawberries for jam production frequently undergo extended storage in sulphite liquor before conversion into jam. Using ^{35}S-labelled sulphite an extensive equilibration of ^{35}S-labelled species between the fruit and the liquor has been demonstrated. Most of the loss of measurable SO_2 was accounted for in terms of (i) the chemical reactions during storage and (ii) the physical losses during jam production. In this work approximately 78% of the liquor sulphite was taken up by the fruit; 98.5% of this reacted chemically or was boiled off, viz. 38% was converted to non-volatile compounds during storage, a further 11% reacted during jam making, 50% was boiled off and 1.5% remained measurable in the jam. AA

GRAPE

2138 SURESH (ER), ETHIRAJ (S) and ONKARAYYA (H). A note on the effect of freezing grape bunches on the composition of musts and wines. *J. Food Sci. Technol. (India).* 18(3); 1981; 119-20

Composition of musts and wines obtained from 5 varieties of grapes frozen and stored at -10 C for 1 month was investigated. Freezing did not alter the sugar content of musts but slightly decreased the acidity except in one variety. Wine from frozen grapes showed a slight decrease in acidity ranging from 0.01 to 0.13% except in one variety. Wines made from frozen grapes had lower tannin content and better colour. KAR

BANANA

2139 SATYAVATI KRISHNANKUTTY, VARKEY (GA) and BHAT (AV). Packaging and storage studies of deep-fat fried Nendran banana chips. *J. Food Sci. Technol. (India).* 18(3); 1981; 104-8

Suitability of flexible packages and inert gas packing in sealed tins for storing fried Nendran banana chips was investigated. It was found that for banana chips fried in fresh coconut oil, 300 guage high density polyethylene and 400 guage low density polyethylene bag packing are satisfactory up to 2 months while packing in tins under CO_2 is satisfactory up to 6 months at room temperature (28-32 C). But banana chips fried in 'marvo' oil, (a hydrogenated vegetable oil containing 0.02% BHA) and packed in sealed tins under CO_2 are quite good upto 6 months whereas the chips fried in groundnut oil and packed under similar conditions were inferior in quality. Addition of turmeric powder at 0.10 to 0.15% level during frying enhanced the colour of the chips which was stable upto 6 months in sealed tins under inert gas packing. AA

CITRUS

2140 JAIN (AV) and HATCH (RC). Determination of aflatoxins in compound feedstuffs containing citrus pulp. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 626-30

MANDARIN

2141 SWATI KUNTE and SHASTRI (NV). Studies on pectolytic and cellulolytic enzymes in Mandarin oranges infected by *Alternaria alternata* (Fr.) Keissl. *J. Food Sci. Technol. (India).* 18(3); 1981; 115-6

Healthy Mandarin oranges were inoculated with spores of *Alternaria alternata* and the changes in enzyme activities were studied. Polygalacturonase (PG), and polymethyl galacturonase (PMG) activities increased upto 10 days after infection in edible portion and upto 13 days in rind. Pectin methyl esterase, and Carboxymethyl cellulase activities also increased after infection but exhibited peaks in early stages of pathogenesis. PG activity was predominant in rind.

PEACH

2142 BARDALAYE (PC), THOMPSON (NP) and CARLSON (DA). Sensitive gas-liquid chromatographic method for asulam residues in peaches. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 511-6

2143 DHILLON (BS), SANDHU (SS) and RANDHAWA (JS). Storage behaviour of Sunred nectarine fruits. *Indian Food Packer.* 35(1); 1981; 9-10

Ripe peach fruits (Sun red, a nectarine cultivar of a smooth skinned variety) were covered with (i) polyethylene, (ii) paddy straw and packed in wooden boxes. They were stored at 10-14 C and 80-85% RH for about 2½ weeks and tested for (a) general appearance, (b) loss in weight (c) rotting (d) TSS (e) acidity and (f) total sugars. It was found that fruits in (i) were better ((a) excellent (b) 1.02-1.08% (c) data not reported, (d) 10% (e) 0.64-0.66% as malic acid and (f) 6.75-7.44% than in (ii) ((a) slight shrivelling (b) 14.53-15.58% (c) data not reported (d) 10%, (e) 0.75-0.79% as malic acid and (f) 6.86-7.10%). BSN

PLUM

2144 MOUTOUNET (M). Co-oxydation of β-carotene in the presence of plum extract (*Prunus domestica* L. var. d'Ente). *Food Sci + Technol.* 12(6); 1979; 338-41

In the presence of prune extract, the β carotene oxidation coupled with the chlorogenic acid and the linolenic acid is studied in model solutions. Plum possesses a factor able of breaking down a part of the β carotene; it has heme protein properties. AA

APPLE

2145 WILLS (RBH) and SCOTT (KJ). The use of calcium chloride dipping to reduce wastage in stored apples. *Food Technol. Aust.* 32(8); 1980; 412-3

Dipping apples in a solution of calcium chloride held at pressures of above or below atmospheric pressures (about ± 51 to 76 KPa) causes the fruit to absorb sufficient calcium (1 to 2 mg Ca/100 g fruit) to markedly reduce the incidence of the physiological disorders, bitter pit and breakdown that occur during the storage of apples. The treatment can also reduce the rate of flesh softening and loss of green colour of fruit during storage. KAR

PHALSA FRUIT

2146 KHURDIYA (DS) and ANAN (JC). Anthocyanins in phalsa (*Grewia subinaequalis* L.) fruits. *J. Food Sci. Technol. (India).* 18(3); 1981; 112-4

Based on paper chromatography and spectral characteristics, two anthocyanin pigments viz., delphinidin-3 glucoside and cyanidin-3-glucoside have been identified in the phalsa fruit. AA

SUGAR, STARCH AND CONFECTIONERY

SUGAR

2147 DAMON (CE) and PETTITT (BC) Jr. High performance liquid chromatographic determination of fructose, glucose and sucrose in molasses. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 476-80

Fructose, glucose and sucrose were determined quantitatively in molasses by high performance liquid chromatography (HPLC) using maltose as an internal standard. After a simple cleanup procedure, chromatographic separation required less than 20 minutes for the 17 molasses samples. HPLC gave lower results for reducing sugars (fructose plus glucose) and for sucrose by an average of 3.9 and 1.2%, respectively when compared to results obtained by classical methods. The lower values are believed to result from elimination of interfering substances by this method. The values probably reflect more accurately the true composition of the molasses. Repetitive injections of a standard solution indicated a coefficient of variation of 2.0% for fructose and glucose and of 2.2% for sucrose. AA

2148 HUDSON (GJ) and BAILEY (BS). Mutual interference effects in the colorimetric methods used to determine the sugar composition of dietary fibre. *Food Chem.* 5(3); 1980; 201-6

The corrections that should be applied are as follows: Let the value from anthrone procedure = h. Let the value from the carbazole procedure=u.

Let the value from the orcinol procedure = P. Then, Hexose concentration = h; uronic acid concentration = u - $\frac{16h}{100}$. Pentose concentration:

$$P - \left(\frac{4.61h}{100} + 0.4939\left(u - \frac{16h}{100}\right)\right)$$

The results presented here and the factors derived from them were obtained with single species of hexose, pentose and uronic acid. KAR

STARCH

2149 UEDA (S) and KOBA (Y). Alcoholic fermentation of raw starch without cooking by using black - *koji* amylase. *J. Ferment. Technol.* 58(3); 1980; 237-42

This is aimed at saving of heat energy used for cooking of starch. The production of ethanol from raw corn and cassava starch with black - *koji* amylase without previous cooking is very useful. After removal of ethanol by a vacuum distillation and raw starch is added to the spurt liquor, alcoholic fermentation of the broth is repeatedly possible. KAR

CONFECTIONERY

2150 KAPPELL. Coconut krokant as a raw material for confectioners. *Confect. Prod.* 46(6); 1980; 268

CHOCOLATE

2151 HURST (WJ) and MARTIN (RA) Jr. High performance liquid chromatographic determination of carbohydrates in chocolate : Collaborative study. *J. Assoc. Off Anal. Chem.* 63(3); 1980; 595-9

A collaborative study determining sucrose, glucose, fructose, maltose and lactose in chocolate products was conducted using a previously published high performance liquid chromatographic (HPLC) method. Five samples (2 milk chocolates, 1 dark chocolate, 1 powdered mix and 1 sirup) were analyzed in duplicate by 7 collaborators. The results indicate adequate method precision. In addition, the HPLC method allows for the simultaneous determination of 5 saccharides in chocolate products in 15 minute. The method has been adopted as official first action. AA

2152 RIEDEL (HR). Sealing and polishing chocolate and sugar dragees. *Confect. Prod.* 46(6); 1980; 270-1

BAKERY PRODUCTS

2153 THOMPSON (DR). State of the Art : Bakery fermentation. *Baker's Dig.* 54(3); 1980; 28-30,32,34,36-7

After reviewing briefly the historical perspective of the bakery fermentation, the article discusses the fermentation systems like water broth systems, tank systems, and positive flow systems; and production of preferments by the above three systems. KAR

2154 HAUCK (BW). Marketing opportunities for extrusion cooked products. *Cereal Food World.* 25(9); 1980; 594-5

Article covers noodles and pasta products, powders, croutons and breadings, crackers and wafers, improved nutrition foods, snack foods, engineered foods and future of extrusion cooking. KAR

BREAD

2155 POMERANZ (Y). What? How much? Where? What function? in bread making. *Cereal Food World.* 25(10); 1980; 656-62

The various aspects covered in this review are: baking tests, protein content, fractionalism, gluten proteins, starch, water solubles, lipids, glycolipids, glycolipid interaction, protein enriched bread and the future of bread making process. KAR

2156 POMERANZ (Y). Molecular approach for bread making: An update and new perspectives. *Getreide Mehl Brot.* 34(1); 1980; 11-22 (German)

A general view on the composition of the wheat grain and the functions of the individual constituents in bread making is given. Formerly, aggressive reagents were used, which damaged many functional properties in the breadmaking. These reagents were then replaced and the doughs were treated in such a way that the functional properties were not affected. It is hoped that with improved methods, all the details of the scientific basis of breadmaking will become explainable in future even at the molecular level. KMD

2157 LEHMANN (TA) and DUBOIS (DK). Pizza crust : Formulation and processing. *Cereal Food. World.* 25(9); 1980; 589-92

2158 GLABE (EF) and SILVERBRANDT (MH). Effects of dextrin on breads with high molasses solids. *Baker's Dig.* 54(3); 1980; 8-12

High molasses solids when used in breads increase mixing time and reduce dough stability. A specific dextrin at 0.5% level was found to speed the gluten-water reaction. Loaf volume response and bread interior structure are significantly improved when this dextrin is used with high levels of molasses. KAR

CAKE

2159 BELSHAW (FR). Effects of modified starches on modern cake formulas. *Cereal Food World.* 25(10); 1980; 648-9

MILK AND DAIRY PRODUCTS

2160 CERNA (M). Methods used abroad to flavour fermented dairy products. *Prumysl Potravin.* 30(8); 1979; 461-2 (Czech)

2161 ZIKAKIS (JP) and WOOTERS (SG). Activity of xanthine oxidase in dairy products. *J. Dairy Sci.* 63(6); 1980; 893-904

2162 ALEXANDER (A). First-class treatment for dairy effluent. *Food Flavour. Ingred. Packag. Process.* 2(1); 1980; 27

2163 ANON. Do sour milk drinks have a future? *Food Flavour. Ingred. Packag. Process.* 2(1); 1980; 15-9

2164 GORNER (F) and UHEROVA (R). Vitamin changes in ultra high-temperature sterilized milk during storage. *Nahrung.* 24(4/5); 1980; 373-9 (German)

The authors studied the dynamics of the losses of vitamin B_1, vitamin B_2, vitamin B_6, nicotinic acid and pantothenic acid in UHT. Milk at 6 C, 20-25 C and 37 C during 10 weeks. The observations were taken four times in the course of two years. The UHT-milk had been heated at 140 C for 3-4, using the Alfa-Laval VTIS-C apparatus with direct steam injection. After 6 weeks storage at room temperature, the milk showed vitamin losses which differed in degree, depending on the type of vitamin (Vitamin B_1, 10%; vitamin B_2, 10%; nicotinic acid 20%, pantothenic acid 30%; vitamin B_6 35%). The vitamin losses produced by the ultra-high-temperature sterilization proper (7) and the vitamin losses due to storage (for 6 weeks at room temperature) the total losses are as follows : vitamin B_2, 10-15%; Nicotinic acid 20-25%; vitamin B_1 25-30%; pantothenic acid 30-35%; and vitamin B6 40-45%. AA

2165 UHEROVA (R) and GORNER (F). Vitamin retention in milk sterilized by ultra-heating. *Prumysl Potravin.* 30(8); 1979; 445-7 (Czech)

2166 MABESA (RC), MARSHALL (RT) and ANDERSON (ME). Factors influencing tenacity of dried milk films exposed to high humidity. *J. Food Prot.* 42(8); 1979; 631-7

2167 FIRSTENBERG-EDEN (R), ROSEN (B) and MANNHEIM (CA). Seasonal and processing influences on bacterial count of raw and processed milk. *J. Food Prot.* 42(8); 1979; 683-5

2168 FRANCIS (DW), SPAULDING (PL) and LOVETT (J). Enterotoxin production and thermal resistance of *Yersinia enterocolitica* in milk. *Appl. Environ. Microbiol.* 40(1); 1980; 174-6

Of the thirty six isolates of *Yersinia enterocolitica* obtained from raw milk at 25 C, three of them produced enterotoxin. None of these strains survived pasteurization. BSN

2169 VEIEROV (D) and AHARONSON (N). Economic method for analysis of fluid milk for organochlorine residues at the 10 ppb level. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 532-5

2170 KUIPERS(A) and SHOOK (GE). Net returns from selection under various component testing plans and milk pricing schemes. *J. Dairy Sci.* 63(6); 1980; 1006-18

2171 REDDY (YVR) and MATHUR (SC). A comparative study on the cost of milk production of cross-bred cows and buffaloes. *Indian J. Anim. Sci.* 50(9); 1980; 690-3

The cost of milk production was worked out for cross bred cows and buffaloes, maintained at an organized dairy farm. The net cost of maintenance of milch animal per day worked out to Rs. 5.9770 for cross-bred cows and Rs. 5.7972 for buffaloes. The cost per kilogram of milk was Rs. 0.8347 and 1.6563 for cross-bed cows and buffaloes respectively. The cost was Rs. 0.7452 and 1.0877 per kilogram of fat-corrected milk, respectively, in cross-bred and buffalo milk. The percentage of net returns over total expenditure realized was 49.74 and 5.65, respectively, in the same order. The feed cost alone accounted for 59.15% in cows and 63.53% in buffaloes. The feed cost was highly related with total lactation yield, number of days in milk and dry days. AA

2172 BREZINA (P), DOLEZALEK (J) and HRDLICKA (P). Enriching milk and fermented dairy products with proteins by adding sodium caseinate. *Prumysl Potravin.* 30(8); 1979; 449-3 (Czech)

2173 CERNA (M). Fermented milk products with higher protein content. *Prumysl Potravin.* 30(8); 1979; 441-3 (Czech)

YOGURT

2174 PINTHONG (R), MACRAE (R) and ROTHWELL (J). The development of a soya-based yoghurt. I. Acid production by lactic acid bacteria. *J. Food Technol.* 15(6); 1980; 647-52

The development of a fermented yoghurt-like food from soya is described. Acid produced by the lactic acid bacteria, *St. thermophilus* and *L. bulgaricus*, singly and combined, was determined and the effects of supplementation with glucose and yeast extract quantified. A product with acceptable acidity was produced using *L. bulgaricus* in soya milk supplemented with 1% glucose and 0.1% yeast extract. AA

2175 PINTHONG (R), MACRAE (R) and ROTHWELL (J). The development of a soya-based yoghurt. II. Sensory evaluation and analysis of volatiles. *J. Food Technol.* 15(6); 1980; 653-9

Soya milk samples fermented with *L. bulgaricus* and *St. thermophilus*, both singly and combined, were tested organoleptically. The volatile compounds responsible for the undesirable flavour in both fermented and unfermented samples were analysed and a correlation between organoleptic quality and the levels of certain compounds demonstrated. AA

2176 PINTHONG (R), MACRAE (R) and DICK (J). The development of a soya-based yoghurt. III. Analysis of oligosaccharides. *J. Food Technol.* 15(6); 1980; 661-7

The effect of fermentation on the levels of oligosaccharides present in soya milk has been determined for a number of lactic acid bacteria. The sugars in the fermented samples were quantified by high pressure liquid chromatography (HPLC) after extraction with aqueous alcohol and clearing with Carrez solution. A lipid extraction stage was found to improve the quality of the chromatograms. Oligosaccharide utilization by *L. fermenti* was found to be less than in some published reports, when fermentation was carried out under optimum conditions for acid production. AA

2177 SINGH (J), KHANNA (A) and CHANDER (H). Antibacterial activity of yogurt starter in cow and buffalo milk. *J. Food Prot.* 42(8); 1979; 664-5

A comparative assessment of the antibacterial activity of pure and mixed strain cultures of *Streptococcus thermophilus* and *Lactobacillus bulgaricus* against *Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas fragi* and *Micrococcus flavus* was made using cow and buffalo milk. A culture filtrate from *S. thermophilus* exhibited no antagonistic action against any of the test organisms, irrespective of the type of milk used and the period of incubation. Culture filtrates from *L. bulgaricus* and the mixed culture caused pronounced inhibition of all the test organisms used. Antibacterial activity of yogurt culture was greater in buffalo than cow milk. AA

BUTTER

2178 KAUL (A), SINGH (J) and KUILA (RK). Effect of potassium sorbate on the microbiological quality of butter. *J. Food Prot.* 42(8); 1979; 656-7

Addition of 0.1% potassium sorbate and incorporation of 2% NaCl +0.1% potassium sorbate resulted in inhibition of mould growth in all the samples after a storage period of 4 weeks at both 18 and 5 C. The effect of potassium sorbate alone was less pronounced, irrespective of storage temperature. Addition of potassium sorbate to butter samples stored at 18 C reduced the coliform count to zero after 4 weeks, while butter with added potassium sorbate and NaCl showed a zero count after 1 week, indicating a cumulative inhibitory effect. KMD

WHEY

2179 ALEXANDER (A). Making the most of whey. *Food Flavour. Ingred. Packag. Process.* 2(1); 1980; 22-5

2180 BAER (RJ), FRANK (JF) and LOEWENSTEIN (M). Freezing point measurement of lactose hydrolysis in acid whey and lactose solutions. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 587-90

A method for determining lactose hydrolysis by freezing point determinations is described. There is a direct relationship between freezing point and lactose hydrolysis in neutralized acid whey (r=0.985) and lactose solutions (r=0.998). In both the acid whey and the lactose solutions that contained 4.6 to 5.0% lactose, the freezing point was depressed approximately 0.050 H for each 1% lactose hydrolyzed. AA

CHEESE

2181 CUER (A), DAUPHIN (G), KERGOMARD (A), ROGER (S), DUMONT (JP) and ADDA (J). Flavour properties of some sulphur compounds isolated from cheese. *Food Sci + Technol.* 12(5); 1979; 258-61

Some sulphur compounds that are known to play an important role in cheese aroma were synthesized: viz., 2,4-dithiapentane; 2,3,4-trithiapentane; 2,3,5-trithiahexane and some S-methylthioesters with acid moieties ranging from C_2 to C_5. Odour thresholds and odour qualities have also been determined. KMD

2182 DOLEZALEK (J), BEZDEKA (Z) and BREZINA (P). Fermentation of lactose in the cheese making processes. *Prumysl Potravin.* 30(8); 1979; 457-9 (Czech)

2183 FAIN (AR) Jr., LOEWENSTEIN (M), SPECK (SJ), BARNHART (HM) and FRANK (JF). Cottage cheese whey derivatives as ingredients of cottage cheese creaming mixes. *J. Dairy Sci.* 63(6); 1980; 905-11

2184 GILLILAND (SE) and STEWART (CF). Amount of yeast and whey protein recovered from cottage cheese whey cultured with *Kluyveromyces fragilis*. *J. Dairy Sci.* 63(6); 1980; 989-90

2185 GORNER (F). Browning of cheese caused by nitrates. *Prumysl Potravin.* 30(8); 1979; 454-6 (Czech)

2186 PAULSEN (PV), KOWALEWSKA (J), HAMMOND (EG) and GLATZ (BA). Role of microflora in production of free fatty acids and flavor in Swiss cheese. *J. Dairy Sci.* 63(6); 1980; 912-8

2187 PEDZIWILK (F), SKUPIN (J), TROJANOWSKA (K) and NOWAKOWSKA (K). Effects of iron ions and 5,6- methylbenzimidazoles on biosynthesis of corrinoids by *Propionibacterium shermanii 1* on cheese-whey medium. *Acta Aliment. Pol.* 5(1); 1979; 61-7

Insufficiency of iron inhibits the growth of propionic acid bacteria. A dose of 5-15 mg $FeSO_4 7H_2O$/litre of medium is optimal for the synthesis of corrinoids, and better utilization of whey lactose by *P. shermanii*. In these samples, the proportion of vitamin B_{12} was also the highest. The yield of corrinoids does not depend on the dose of 5,6-dimethylbenzimidzole (DMB) - which may vary from 10-30 mg/l of culture - but rather on the time of its introduction into the cultures. Maximum synthesis of corrinoids was obtained when DMB was added 24 hour before the end of fermentation (or after 8 days of fermentation). KMD

88 THOMAS (MA), NEWELL (G) and ABAD (G). Effects of freezing on the objective and subjective properties of processed cheese. *J. Food Technol.* 15(6); 1980; 599-605

Onset of over maturity in processed cheese may be retarded by freezing. BSN

89 WARE (GM), THORPE (CW) and POHLAND (AE). Determination of roquefortine in blue cheese and blue cheese dressing by high pressure liquid chromatography with ultraviolet and electrochemical detectors. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 637-41

90 WOLFSCHOON (AF) and FURTADO (MM). Changes in soluble nitrogen, pH and lactic acid during ripening of chabichoutype cheese. *J. Food Prot.* 42(8); 1979; 666-7

MEAT AND POULTRY

191 DAGERSKOG (M). Infra-red radiation for food processing. II. Calculation of heat penetration during infra-red frying of meat products. *Food Sci + Technol.* 12(5); 1979; 252-7

192 KWASNIEWSKA (I), BARYLKO-PIKIELNA (N), JACORZYNSKI (B) and ZAWADZKA (L). Characteristic of functional properties of protein preparations in meat systems. *Acta Aliment. Pol.* 5(1); 1980; 21-37

193 MAXWELL (RJ), MARMER (WN), ZUBILLAGA (MP) and DALICKAS (GA). Determination of total fat in meat and meat products by a rapid, dry column method. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 600-3

194 MUSCHIOLIK (G) and SCHMANDKE (H). Studies on the determination of the texture profile of meat products. *Nahrung.* 24(4/5); 1980; 433-46 (German)

The texture profiles of meat products such as beef and pork were analysed by means of sensory and instrumental methods to derive the degree of simulation. The samples were subjected to tensile and compressive loading. The results show that in case of meat and simulated meat products with non ordered protein fibres the results from the sensory analysis of the mechanical properties are in fair agreement with those obtained from the instrumental determination. Since the measurement of texture profile must take into account all the mechanical and geometrical values, a further specification of the sensory analysis and modifications of the instrumental methods are considered necessary. KMD

2195 SKJOLDEBRAND (Chr.) and OSTE (R). Some aspects of frying of meat products in a forced convention oven. *Food Sci + Technol.* 12(6); 1979; 325-9

The optimum conditions for the frying of meat products (e.g. meat loaf) in a forced convection oven have been fixed as : (i) a low air temperature, say 150 C; (ii) a high air velocity, say 9 m/0; and (iii) a dry air. Weight losses and crust colour are functions of air temperature; the impression of taste and of general appearance are both dependent on crust colour. The best score for the appearance of a meat loaf is between 10 and 16% brightness. KMD

2196 STILES (ME) and NG (L). Fate of enteropathogens inoculated onto chopped ham. *J. Food Prot.* 42(8); 1979; 624-30

2197 KLETTNER (PG) and BAUMGARTNER (PA). The technology of raw dry sausage manufacture. *Food Technol. Aust.* 32(8); 1980; 380-2, 384

This review on dry sausages described the types of raw sausage, production, ripening including curing, acid development, firmness development, drying and flavour. KAR

2198 HOLLAND(GC). Quality standards for retail meats. *J. Food Prot.* 42(8); 1979; 675-8

BEEF

2199 BEVILACQUA (AE) and ZARITZKY (NE). Ice morphology in frozen beef. *J. Food Technol.* 15(6); 1980; 589-97

A histological study was made of pieces of meat which had been frozen from one side, in conditions where the direction of the heat flux was approximately unidirectional and perpendicular to the muscle fibres. The morphology of the ice crystals in tissue frozen under various conditions was studied, and the range of freezing velocities over which no intercellular ice existed, was established. The average diameter D, of ice crystals, measured in different experiments and at different levels in the same piece of meat was related to the characteristic freezing time t_c, by the equation:

$D = a + b \log t_c$. AA

2200 GAJDUSEK (S). Contents of chymosin and beef pepsin in traditional rennets. *Prumysl Potravin.* 30(8); 1979; 443-4 (Czech)

2201 MAXSTADT (JJ) and POLLMAN (RM). Spectrophotometric determination of sulfites, benzoates, sorbates, ascorbates and added blood in ground beef: Collaborative study. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 667-74

2202 SEIDEMAN (SC), SMITH (GC), DUTSON (TR) and CARPENTER (ZL). Physical, chemical and palatibility traits of electrically stimulated, hot-boned, vacuum-packaged beef. *J. Food Prot.* 42(8); 1979; 651-3

Longissimus muscles from electrically stimulated, hot-boned (ESHB) beef had lower ($p < 0.05$) juiciness ratings than those from conventionally handled sides; semi-membranous muscles from such sides sustained lower ($p < 0.05$) weight losses during storage, but higher ($p < 0.05$) cooking losses than muscles from conventionally handled sides. Hot-boning of electrically stimulated beef had no effect ($p < 0.05$) on tenderness, flavour desirability, pH, sarcomere length, amount of non-protein nitrogen, or percentage of soluble myofibrillar proteins; slight alterations were noted in the electrophoretic banding patterns, on SDS gels, of myofibrillar proteins from ESHB sides. Hot-boned beef was as palatable as conventionally handled beef, if sides were electrically stimulated on

the kill floor before hot-boning, and if beef from both treatments was vacuum-packaged and aged for 2 weeks at 1 ± 1 C. KMD

SHEEP

203 KHAN (BU), BHAT (PN) and GARG (RC). Prediction of lamb carcass composition and yield traits from live lamb and carcass traits. *Indian J. Anim. Sci.* 50(9); 1980; 681-4

The data adjusted for age and weight of dam at lambing, year and season for lambing on 94 male Muzaffarnagari and Corriedale half-breds were used to develop prediction equations for carcass composition and yield based on live lamb and carcass traits. Among the live lamb traits, slaughter weight was the best predictor of fat per cent and eye-muscle area. Among the carcass traits, carcass weight, cannon bone length and carcass length were important in predicting composition and eye-muscle area. The study revealed that by and large, body measurements were not good predictors of carcass composition and yield traits in Indian sheep. AA

GOAT

204 RAWAL (TN), BALI (KS) and SHARMA (RN). Evaluation of representative microbiological sampling sites of goat and sheep dressed carcasses. *Def. Sci. J.* 30(3); 1980; 131-6

Statistical analysis of data of number of sampling points for microbial counts representing the entire goat/sheep carcass was carried out. Thirty two sampling points were evaluated out of which fourteen were found to represent the entire dressed carcass for assessing its hygienic efficacy. BSN

PORK

2205 DUITSCHAEVER (CL) and BUTEAU (C). Incidence of Salmonella in pork and poultry products. *J. Food Prot.* 42(8); 1979; 662-3

2206 WARRIS (PD) and AKERS (JM). The effect of sex, breed and initial carcass pH on the quality of cure in bacon. *J. Food Technol.* 15(6); 1980; 629-36

The relationship between the pH_{45} measured in the *M. longissimus dorsi* and the subsequent appearance of Wiltshire style bacon was examined in 110 pig carcasses. Except for extremely PSE and DFD carcasses, which produced bacon of poor appearance, there was an inverse relationship between pH_{45} and the quality of appearance of bacon. There were no differences between hogs and gilts for either pH or bacon quality. The appearance of bacon was slightly better in breeds with lower mean pH_{45} values but the differences were not significant. AA

SWINE

2207 SATHER (AP), MARTIN (AH), JOLLY (RW) and FREDEEN (HT). Alternative market weights for swine. I. Feedlot performance. *J. Anim. Sci.* 51(1); 1980; 28-36

2208 CHRISTIAN (LL), STROCK (KL) and CARLSON (JP). Effect of protein, breed cross, sex and slaughter weight on swine performance and carcass traits. *J. Anim. Sci.* 51(1); 1980; 51-8

POULTRY

2209 ABDEL-RAHMAN (MM) and EL-NAGGAR (SZA). Chemical composition and feeding values of 'Baladi' and 'Navel' orange-meals in poultry rations. *Indian J. Anim. Sci.* 50(6); 1980; 493-5

CHICKEN

2210 HUFF (WE), DOERR (JA), HAMILTON (PB), HAMANN (DD), PETERSON (RE) and CIEGLER (A). Evaluation of bone strength during aflatoxicosis and ochratoxicosis. *Appl. Environ. Microbiol.* 40(1); 1980; 102-7

2211 COX (NA) and MERCURI (AJ). Recovering low levels of various *Salmonella* serotypes from deep-frozen broiler carcasses by direct enrichment. *J. Food Prot.* 42(8); 1979; 660-1

2212 THOMAS (CJ) and McMEEKIN (TA). Contamination of broiler carcass skin during commercial processing procedures : An electron microscopic study. *Appl. Environ. Microbiol.* 40(1); 1980; 133-44

EGG

2213 NIEWIAROWICZ (A) and TROJAN (M). Effect of enzymes addition on foamability of egg-white products. *Acta Aliment. Pol.* 5(1); 1979; 39-47

Effects of pancreatin, trypsin, Amylopol P (preparation from *Asp. oryzae*, and alpha-amylase on the whipping properties of frozen, pan dried, and spray-dried albumen were investigated. Pancreatin markedly influenced a foamability of the all mentioned products, while the others enzymes affected foamability of frozen and or pan-dried egg-white only. The changes in glycoproteins of egg-white due to pancreatin and presumable action of alpha-amylase are discussed. AA

2214 SZOKOLAY (A), UHNAK (J) and MADARIC (A). Dynamics of hexachlorobenzene residues in poultry meat and in eggs. *Nahrung*. 24(4/5); 1980; 381-7 (German)

In a feeding experiment with poultry a more than two fold cumulation of hexachlorobenzene (HCB) in eggs and in meat and a 7.5 fold cumulation in fat, in comparison with the concentration in the feed, have been demonstrated. With the aid of a combined identification by gas chromatography (before and after a conversion into anisole derivatives) and by thin layer chromatography the presence of pentachlorophenol in the liver, in fat and in muscles after feeding the birds with HCB as well as BHC isomers has been proved. 2,4,6 trichlorophenol and 2,4 dichlorophenol were found by thin layer chromatography (without derivatisation). While 2,4,6 trichlorophenol was found after feeding with HCB only, 1,2,4,5 tetrachlorobenzene has been detected by gas chromatography after feeding with HCB as well as with BHC isomers. AA

SEAFOODS

2215 HUSS (HH) and RYE PETERSON (E). The stability of *Clostridium botulinum* type E toxin in salty and/or acid environment. *J. Food Technol.* 15(6); 1980; 619-27

2216 LUCKAS (B), WETZEL (H) and RECHLIN (O). On the contamination of fishes from the Baltic sea by polychlorinated biphenyls. *Nahrung*. 24(4/5); 1980; 405-11 (German)

Using a reaction gas chromatographic method, the authors determined the PCB contents of important fish species from three major fishing grounds in the Baltic sea. They found that the PCB contents had but insignificantly changed in the period 1975-1979. Due to the simultaneous considerable reduction in total DDT content, there is a drift in the PCB/total DDT ratio. The causes of regional and seasonal variations are discussed. AA

2217 MARTONE (CB), CRUPKIN (M), BARASSI (CA) and TRUCCO (RE). Determination by protein in fish meal. *J. Sci. Food Agric.* 31(8); 1980; 782-4

The protein values obtained by colorimetric Lowry method was lower. For fish meal from different species the general factor 1.19 ± 0.03 (confidence limit for $p < 0.01$) may be used to convert protein values obtained by Lowry method into protein values obtained by the Kjeldahl method. KAR

2218 SREEINIVASIAH (PV), PRATHAPKUMAR (KS), RAMAPPA (BS) and BHANDARI (CS). Influence of residual fat in fish meal on brioler performance. *Indian Poult. Gaz.* 64(3); 1980; 75-8

COD

2219 JENSEN (MH). Chemical and textural changes resulting from freeze drying of minced cod flesh. *Food Sci + Technol.* 12(6); 1979; 342-5

Freeze-drying of minced cod resulted in a sizable reduction of the salt-soluble protein (SSP), regardless of the history of the raw material and the temperature of freeze-drying. The presence of "kidney" blood did not affect the SSP level of the freeze-dried products. Possibly, formaldehyde is agent that makes the protein of freeze-dried minced cod insoluble. KMD

2220 LICCIARDELLO (JJ), RAVESI (EM), ALLSUP (MG), BROOKER (JR) and KING (FJ). Frozen storage characteristics of mixed fillet-mince cod blocks. *Food Sci + Technol.* 12(5); 1979; 290-2

Cod fillet blocks containing 0,10,20 or 30% cod mince were stored frozen as such, or as blanched breaded sticks. The mixed fillet-mince blocks had a higher aerobic plate count than the all-fillet blocks. No differences were observed in the cross-sectional appearance of the blocks, or in the appearance, flavour, or texture of the stored sticks, or sticks prepared from stored blocks, during storage for 48 weeks at -17.8 C, or for 32 weeks at -6.7 C. the presence of mince did not bring about any change in the thiobarbituric acid value of the sample; the dimethylamine content was higher in blocks having 30% mince; extractable protein nitrogen dropped sharply for all block samples during the early storage period, but was found to be slightly higher for the all-fillet block. KMD

TILAPIA

2221 RAMACHANDRAN NAIR (KG) and GOPAKUMAR (K). Effects of dietary fat on deposition of fat and fatty acid composition of Tilapia (*Tilapia mossambica*). *J. Food Sci. Technol. (India)*. 18(3); 1981; 108-11

Feeds containing residual oil in groundnut, coconut oil, mustard oil and sardine oil as sources of fat (upto 2.1-7.2% fat in feed) were fed to Tilapia fish over 6 months period and the visceral and body fats were studied. Coconut oil induced maximum deposition of saturated fatty acids and lower fatty acids

(C_6, C_8, C_{10}, C_{12}, C_{14}) in the viscera and body fat of fishes. Mustard oil induced maximum amount of deposition of polyunsaturated fatty acids followed by sardine oil. Deposition of C_{12}:1 acid in body as well as viscera was very significant in fish fed feed containing mustard oil. It is concluded that dietary fatty acid pattern has got significant effect on the fatty acid composition of the fish. KAR

PROTEIN FOODS

Nil

FRUIT JUICES AND BEVERAGES

FRUIT JUICES

2222 MANDROU (B) and BRESSOLLE (F). Thin layer chromatography reflectometric determination of benzoic or sorbic acids fruit beverages. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 675-8

A procedure is proposed for the quantitative determination of both benzoic and sorbic acids in fruit beverages. This method is carried out by direct ultraviolet spectrophotometric measurements in silica chromatoplates after development with chloroform-methanol-water (65+35+7) and makes use of an internal standard. Applied to samples spiked with benzoic and sorbic acids, this technique gives accurate and reliable results with good recoveries. The sensitivity (about 1 ppm) is particularly convenient for trace level determination. AA

CITRUS

2223 CICHOWICZ (SM) and BANDLER (R). Determination of *Geotrichum* mold in citrus juices : Collaborative study. *J. Assoc. Off. Anal. Chem.* 63(3): 1980; 483-4

ORANGE

2224 ARCHER (AW). Determination of benzoic and sorbic acids in orange juice by high-performance liquid chromatography. *Analyst.* 105(1249); 1980; 407-9

The HPLC method reported involves use of p-toulic acid as the internal standard, which enables direct injection of adequately diluted aqueous samples of orange juice. Typical retention times were : ascorbic acid 2.0 minutes, sorbic acid 5.5 minutes benzoic acid 7.2 minutes and p-toulic acid 9.7 minutes. The mean ratio of peak areas for benzoic and p-toulic acids, corrected for amount of benzoic acids present, was 0.997 when sorbic acid was absent, while in the presence of sorbic acid the mean new peak area ratio was 0.980. BSN

SOFT DRINK

2225 SCOTT (FW) and TRICK (KD). Carbohydrate content and caloric values of carbonated soft drinks. *Food Chem.* 5(3); 1980; 237-42

BY HPLC it was possible to determine glucose, fructose and sucrose in soft

drinks. Calorie values calculated from total sugar content were within 10% of values obtained by combustion. KAR

COFFEE

2226 ANON. ABC of coffee: Coffee terms. *Indian Coffee.* 45(3); 1981; 64

Definitions of the following coffee terms are given: Silver Skin, Small stone, Small stick, Small cold, Shell, Spongy bean, Stinker bean, Sour bean, Selection, Screening, Shrivelled, Sieve, Soft bean, Spotted bean, Sizing, Stripping, Sweepings, Sweet, Sour, Stale. KMD

2227 ANON. ABC of coffee: Coffee terms. *Indian Coffee.* 45(4); 1981; 109

Definitions of the following 11 coffee terms are given: Triage residue, Screenings; Triage sorting; Triage; Tails; Taint, Taste, Taster, Tasting, Thick, Thin, Tolerance. KMD

COCOA

2228 KREISER (WR) and MARTIN (RA) Jr. High pressure liquid chromatographic determination of theobromine and caffeine in cocoa and chocolate products. Collaborative study. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 591-4

Four duplicate, samples of cocoa-containing materials, a practice sample, and standards were submitted to the collaborators for theobromine and caffeine analysis by HPLC. In the method the samples are defatted with petroleum ether, and dried. The fat-free residue is then extracted with water and an aliquot is injected into the chromatograph. Compounds are quantitated by comparison with internal or external standards, either by peak height or peak area. Results for all the analyses showed that few of the values were more than 2 standard deviations from the mean. The method has been adopted as official first action. AA

TEA

2229 QURESHI (SZ), NAJIB (FM) and MOHAMMED (FA). Ion exchange method for rapid determination of alkalinity of water-soluble tea ash containing high levels of manganese. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 460-1

An ion exchange method to determine the alkalinity of water-soluble tea ash containing high levels of manganese is described. A chromatographic column containing a strong cation exchange resin (20-50 mesh) in Na^+ form, with a bed volume of 5 ml is used. The present ion exchange method is compared to pH titrations and also to the official AOAC methods (31.012, 31.015, 31.016). Results with the new method are accurate and precise. AA

2230 ROBERTS (GR), FERNANDO (RSS) and EKANAYAKE (A). A study of the changes undergone by tea polyphenols in solution using high performance liquid chromatography. *J. Food Sci. Technol. (India).* 18(3); 1981; 118-9

Changes undergone by tea polyphenols during storage for 168 hour at room temperature (24-28 C), (both with aeration rate of 30 ml oxygen/minute and without aeration) and at 55-60 C was investigated. Quality deterioration was most rapid at higher temperature when the liquid turned dark brown within 24 hour. The principal changes observed were the formation of a group of compounds allied to thearubigins. There was no marked change in theaflavin content. KAR

ALCOHOL

2231 ETHRIDGE (MW) and MARTIN (GE). Automated system for the gas-liquid chromatographic analysis of denatured alcohol. *Analyst.* 105(1249); 1980; 403-7

WINE

2232 GOFF (EU) and FINE (DH). Analysis of volatile N-nitrosomaines in alcoholic beverages. *Food Cosmet. Toxicol.* 17(6); 1979; 569-73

A rapid extraction procedure for the analysis of volatile N-nitrosamines in alcoholic beverages is described. Volatile nitrosamines were not found in any of the wines, sherries, liqueurs, brandies, gins, vodkas and rums that were analysed. All 18 brands of domestic and imported beer contained NDMA, at levels ranging from 0.4 to 7.0 µg/litre and six out of seven brands of Scotch whisky were also shown to contain NDMA, at levels between 0.3 and 2.0 µg/litre. AA

2233 HANNEMANN (W) and RADLER (F). Study of the influence of different yeast strains on the content of extract in wine. *Dtsch. Lebensmittel-Rundschau.* 76(11); 1980; 377-83

Multiple determinations of the total extract of one wine sample showed an analytical error characterized by the following standard deviation(s) and maximum absolute error (Δx): Total extract: s = + 0.2 g/l, Δx=+ 0.3 g/l; Non-reducing extract: s = ±0.3 g/l, Δx = ±0.4 g/l; Residual extract (depending on method of calculation) : s = ±0.5 to ± 0.8 g/l; and Δx = ±0.7 to ± 1.0 g/l. When the same grape was fermented with 17 different strains of *Saccharomyces cerevisiae*, the values for the non-reducing extract varied between 30.4 and 34.0 g/l. Tests with other *Saccharomyces* yeasts yielded values between 25.9 and 43.1 g/l. The use of different methods of calculation led to varying results for the residual extract. Similarly, different yeast strains also yielded varying values for residual extract. The average value obtained with 17 strains of *S. cerevisiae* was 16.9 g/l. Strain 98, however, yielded a value that was 3.7 g/l higher than the mean value. When *Saccharomyces bailii* was used for fermentation, the residual extract varied between 13.3 and 30.2 g/l. KMD

2234 WATANABE (M) and SHIMAZU (Y). Effect of yeasts on botrytised wine making. *J. Ferment. Technol.* 58(3); 1980; 227-35

The effect of yeasts on botrytised wine making was investigated using *Kloeckera apiculata*, *Saccharomyces bailii* and *Saccharomyces cerevisiae* variety *vini*. Addition of the yeast cells to botrytised must significantly stimulated secondary production of glycerol by *Botrytis cinerea* (secondary glycerol fermentation), and reduced the formation of acetaldehyde and higher alcohols. *S. cerevisiae* variety *vini* predominantly produced ethyl alcohol in botrytised must with a high sugar content, while *K. apiculata* scarcely fermented high sugar-must containing over 27.5% sugar. Appreciable depression of alcoholic fermentation with *S. bailii* and *K. apiculata* by high concentrations of sugar of blended botrytised must resulted in the decrease of assimilation of fructose by *S. bailii* and of the production of ethyl acetate by *K. apiculata*. An artitifically botrytised noble wine of high quality was obtained by alcholic fermentation of blended must composed of high concentrated grape must and botrytised must fermented by the yeasts. AA

BEER

2235 KIRSOP (BH). The control of beer pH. *Bev. Food World.* 7(4); 1980; 52,54-6

OILS AND FATS

2236 McGILL (EA). The chemistry of frying. *Baker's Dig.* 54(3); 1980; 38-42
This review covers different aspects like the basic chemistry of fats and oils, the chemistry of fat spoilage, including oxidation, isomerization, pyrolysis and hydrolysis; visible effects of chemical spoilage; role of the oil refiner and the role of the fryer operation. KAR

2237 PATEL (AR) and SHAH (RM). Strategy for bridging edible oil gap. *East. Econ.* 75(14); 1980; 789-93

2238 HEATH (AB) and BLACK (RB). Improvements to assisted distillation cleanup of pesticide residues in animal fats. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 529-31

SPICES AND CONDIMENTS

2239 PRUTHI (JS). Spices as natural food colourants. *Bev. Food World.* 7(4); 1980; 38,40-7

2240 PRUTHI (JS). Spices as preservatives for foods. *Bev. Food World.* 7(4); 1980; 24-8, 30

GARLIC

2241 MANTIS (AJ), KOIDIS (PA), KARAIOANNOGLOU (PG) and PANETSOS (AG). Effect of garlic extract on food poisoning bacteria. *Food Sci + Technol.* 12(6); 1979; 330-2
The combined effect of different concentrations of garlic extract and pH and temperature values on the out-cropping of *Cl. perfringens* spores in culture media was studied. *Cl. perfringens* spores were not able to grow even under optimal conditions (i.e. pH 7.0, t=40 C) when the concentration of garlic extract in the medium exceeded 1% for small to medium inocula (2×10^2 to 1×10^4 spores/ml), and 2% for large inocula (1×10^5 spores/ml). KMD

CARDAMOM

2242 VARKEY (AG), GOPALAKRISHNAN (M), THOMAS (PP) and MATHEW (AG). Artificial drying of cardamom. *Cardamom.* 13(3); 1981; 3-9

2243 VARKEY (AG), GOPALAKRISHNAN (M), MATHEW (AC) and SHIVASHANKER (S). Rapid methods for determination of moisture in cardamom capsules. *Cardamom.* 13(6); 1981; 15-9
Both dielectric and conductivity moisture meter readings have shown some relationship with moisture determined by toluene distillation method. Kappa moisture meter based on dielectric has shown satisfactory results as a possible rapid method of determination of moisture, if caliberation in carried out in

each case of similar samples. AA

MURRAYA

2244 PHILIP (J), PETER (KV) and GOPALAKRISHNAN (PK). Curry leaf: a mineral packed leafy vegetable. *Indian Hort.* 25(4); 1981; 2,27

The flavouring properties, chemical composition and medical and food uses of curry leaf (*Murraya koenigii*) are delineated. The leaves have a slightly pungent, bitter and feebly acidulous taste which is retained after drying. The composition of the leaf is: moisture, 66.3%; fat 1.0%; carbohydrate, 16.0%; fibre, 6.4%; minerals 4.2%; carotene, 12,600 I.U./100 g; nicotinic acid, 2.3 mg/100 g; and vitamin C, 4 mg/100 g. Besides they also contain a crystalline glucoside (Koenigii) and some resin. Curry leaves are extensively used in the Indian dietary as a flavour ingredient in the preparation of curries. MVG

PICKLES

2245 BHASIN (U) and BHATIA (BS). Recent advances in technology of pickles, chutneys and sauces. *Indian Food Packer.* 35(1); 1981; 39-58

Aspects covered include: raw materials/quality control, brining, physico-chemical aspects, microbiological aspects, taste, texture, colour, flavouring composition, packaging, processing techniques, storage, new receipes, mechanization/automation and research needs. BSN

OLEORESIN

2246 RAJARAMAN (K), NARAYANAN (CS), SUMATHY KUTTY (MA), SANKARIKUTTY (B) and MATHEW (AG). Ethyl acetate as a solvent for extraction of spice oleoresins. *J. Food Sci. Technol. (India).* 18(3); 1981; 101-3

Oleoresin was extracted from pepper, chilli, ginger and turmeric using (i) ethyl acetate instead of (ii) ethylene dichloride or (iii) acetone. (i) is inflammable and sparingly soluble in water. The extraction yield (%) with (i), (ii) and (iii) was 6.7, 6.2 and 7.4, for pepper 10.8, 10.5 and 10.6 for chilli, 4.2, 4.1 and 4.5 for ginger and 7.2, 7.0 and 7.7 for turmeric respectively. The cost of extraction with (i) was lowest (Rs. 9.25/kg) and the quality of oleoresin was also good and hence advised as a suitable solvent for oleoresin extraction. KAR

2247 WOODBURY (JE). Determination of capsicum pungency by high pressure liquid chromatography and spectrofluorometric detection. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 556-8

A method has been developed to determine pungency due to capsaicinoids in capsicums and their oleoresins. Capsaicinoids are extracted from the capsicums with 95% ethanol saturated with sodium acetate, separated by high pressure liquid chromatography (HPLC) and detected by spectrofluorescence. The method is sensitive to 2 ppm (approximately 30 Scoville), with a standard deviation of 9 ppm at 150 ppm and a standard deviation of 129 ppm at 1500 ppm. Depending on the pungency level, 20-50 samples can be analyzed in 8 hour. Comparative data for pungency determined organoleptically and by this method gave a correlation coefficient of 0.98 on samples ranging from 100 to 700 ppm capsaicin. AA

SENSORY EVALUATION

2248 MOSKOWITZ (HR) and CHANDLER (J). The psychophysical analysis of food perception: models and approaches. *Food Sci + Technol.* 12(5); 1979; 293-300

This paper illustrates the continuum of psychophysical research, beginning with model systems and finishing with a complex, multi-ingredient food. The method of magnitude estimation was used to quantify perceptions of overall product intensity, hedonics and individual attributes. The paper contrasts simple systems vs. real foods. For simple systems, interest is focused on the underlying relation between ingredient level and sensory/hedonic/quality responses, in order to develop laws of product perception. For complex systems, where researchers cannot evaluate all interactions among ingredients and all attribute a pragmatic approach is taken. Research then aims at producing a desired product perception, using psychophysical data as inputs. The focus is on the end-product, rather than on the sensory system. AA

2249 HERRMANN (J), KIENER (W) and ABD ELSALAM (I). New methods for the evaluation and the analysis of organoleptic qualities of foodstuffs and for the forecast of their changes. Part 13. The estimation of the smell perception values of pure aroma substances and of their solutions as a method for determining their vapour pressures. *Nahrung.* 24(4/5); 1980; 389-97 (German)

The authors describe the use of air odorimeter to determine the smell perception values of air-diluted gas mixtures which are in equilibrium with aqueous vanillin and diacetyl solutions. In the case of diacetyl, the slope of the linear representation of the power function of the perception values is twice that observed for values obtained by smelling diacetyl solutions of varying concentration. This can be explained positive deviations from Raoult's law. Vanillin does not show these deviations. The absolute vapour pressure of vanillin has been determined using an odorimeter. KMD

2250 PANGBORN (RM). Sensory science today. *Cereal Food World.* 25(10); 1980; 637-40

The recent advances with particular emphasize on the correct methodology have been discussed. KAR

FOOD STORAGE

2251 KRISHNAMURTHY (TS), SHANKARAMURTHY (KN), GURUSIDDAPPA (L) and MURALIDHARAN (N). Evaluation of a light panelled structure for storage of foodgrains and as a quarantine fumigation chamber. *Indian Food Packer.* 35(1); 1981; 13-22

The proposed typical structure for storage of 6 tonnes of grain has an overall dimension of 2.5 m length, 2.5 m breadth and 2 m height. Each wall has two GI sheet panels, each measuring 1 m x 1.5 m and placed horizontally one over the other. A door in the front wall measuring 1 m x 1.5 m enables loading and unloading of grain. The structure is mounted on a rodent proof concrete plinth 25 cm above ground. The joints in the walls and roofs are lined with neoprene rubber or tar felt and coated with thick coating of an asphalt covered compound. To protect the structure from sun and rain, asphalt impregnated card board laminations with corrugations are employed. The structure is made airtight by using rubber lining on the door frame and for tower bolts. Coating the interspace with Aluminium paint reduces effect of heat on the structure. Inside surface of the chamber is coated with three coatings of emulsions to increase the effectiveness of gas proofing ability. When used as a fumigation

chamber, a few additional facilities are required for the storage structure. Paddy (initial moisture (of 14%) may be stored in good condition for 6 months. As a fumigation chamber with methyl bromide (16 ml/m), gas impounding potency was found to be 85%. The durability of the structure is 10-20 years and the construction cost will be Rs. 3,800. BSN

2252 KOVACS (AS). The dagon grain silo and the grain museum in Haifa an unique undertaking and museum. *Getreide Mehl Brot.* 34(1); 1980; 26-8 (German)

The text describes the grain silo and the museum in the city Haifa built by Dagon Batey Mamguroth Israel Ltd. The special features of this silo are its Moledeth elevators. The various advantages of this system are explained. The museum has a collection of grains some of which are 4000 years old. The history and development of todays Israel are also illustrated with the help of excellent photographs. KMD

2253 SCHAICH (KM). Free radical initiation in proteins and amino acids by ionizing and ultraviolet radiations and lipid oxidation. Part III : Free radical transfer from oxidizing lipids. *CRC Crit. Rev. Food Sci. Nutr.* 13(3); 1980; 189-244

Discusses : basic principles; ionizing or UV radiations; reactions with other free radicals; one electron oxidation - reduction reactions, both enzymatic and nonenzymatic, factors affecting lipid oxidation; polyunsaturation and nature of lipids; anti and prooxidants; water activity; interactions of oxidizing lipids with proteins; free radical interactions; and direct observation of free radical interactions - EPR studies. BSN

INFESTATION CONTROL AND PESTICIDES

2254 SEN GUPTA (AK) and MISRA (HK). Studies on potential pesticides. Part 12 : Synthesis and biological activity of N^1-Aryroxyacetyl-N^4-aryl-3-thiosemicarbazide, 1,2,4-triazole and 1,3,4-oxadiazole derivatives. *Def. Sci. J.* 30(2); 1980; 59-62

2255 WOOLSON (EA) and AHARONSON (N). Separation and detection of arsenical pesticide residues and some of their metabolites by high pressure liquid chromatography-graphite furnace atomic absorption spectrometry. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 523-8

2256 VICKREY (TM), KARLESKY (DL) and BLACKMER (G). Colorimetry and high performance liquid chromatography of atrazine residues in soil: Comparison of methods. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 506-10

2257 BARRY (C) and PIKE (RK). High pressure liquid chromatographic determination of difenzoquat in formulations. *J. Assoc. Off. Anal. Chem.* 63(3). 1980; 647-9

2258 NANDA KUMAR (NV) and RAMASUNDARI (M). Colorimetric determination of methyl parathion and oxygen analog. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 536-8

2259 HA (Y-D) and BERGNER (K-G). Thin-layer chromatographic investigations to detect phenylurea and n-phenyl carbamate residues in carrots, potatoes and wine. I. Detection and identification of the active ingredients. *Dtsch. Lebensmittel-Rundschau.* 76(11); 1980; 390-4

As it is desirable to fix the maximum tolerable residues of herbicides like Propham and Chloropham in foods and beverages, the authors have carried out

experiments on the estimation of phenyl ureas, n-phenyl carbamates and their derivatives by thin-layer chromatography. The samples are subjected to TLC without additional cleaning (except in the case of carrots), and the spraying agent used is an acetonic fluorescanine solution. The two-dimensional TLC technique is recommended for visual examination; one-dimensional chromatographs are required if a TLC spectro-photometer is used. The latter ensures a greater sensitivity. In carrots, potatoes, and wine, the active ingredients could be detected in quantities down to 0.1 ppm. KMD

2260 RAGHEB (HS). Evaluation of methanol extraction for determination of bacitracin in feeds. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 444-7

2261 FERREIRA (JR) and SILVA FERNANDES (AMS). Gas-liquid chromatographic determination of organophosphorus insecticide residues in fruits and vegetables. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 517-22

2262 INDIRA (M) and KURUP (PA). Effect of black gram fiber on the toxic effects of organophosphorus insecticides. *Indian J. Exp. Biol.* 18(12); 1980; 1529-30

Fibre isolated from black gram was fed at 30% level in the diet to rats, while malathion was given at a dose of 200 mg/kg body weight/day. The activity of acetylcholinesterase in the serum and brain, which had been reduced to a low level by malathion, was raised by the fibre. The latter also prevented retardation of the growth of rats caused by malathion. KMD

2263 LILLEY (M), RUFFELL (RN) and SOMERVILLE (HJ). Purification of the insecticidal toxin in crystals of *Bacillus thuringiensis*. *J. Gen. Microbiol.* 118(1); 1980; 1-11

2264 McDERMOTT (WH). High performance liquid chromatographic determination of carbaryl insecticide in formulations. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 650-2

2265 HUSON (LW). Statistical analysis of comparative field trials of acute rodenticides. *J. Hyg.* 84(3); 1980; 341-6

The present method of analysis of data from comparative field trials of acute rodenticides was compared with two alternative methods of analysis, using computer simulation techniques. One of the proposed alternative analyses, the use of post-treatment census taken as a percentage of pre-treatment census takes in an analysis of variance, was found to be more accurate, to avoid a theoretical difficulty associated with the present method, and is computationally much simpler. AA

BIOCHEMISTRY AND NUTRITION

2266 KROYER (G) and WASHUTTL (J). The influence of water soluble vitamins and essential amino acids on the stability of sodium saccharin and sodium cyclamate under thermal treatment. *Food Sci + Technol.* 12(5); 1979; 284-6 (German)

2267 JELTEMA (MA) and ZABICK (ME). Revised method for quantitating dietary fibre components. *J. Sci. Food Agric.* 31(8); 1980; 820-9

This paper proposes a modification to existing methods of fibre separation and quantification. Dietary fibre in the form of water soluble hemicellulose, and pectin, water-insoluble hemicellulose, water insoluble pectin, and lignin

are determined. Recovery values and remaining methodological problems are discussed. KAR

2268 McLAUGHLAN (JM), ANDERSON (H), HACKLER (LR), HILL (DC), JANSEN (CR), KEITH (MO), SARWAR (G) and SOSULSKI (FW). Assessment of rat growth methods for estimating protein quality: Interlaboratory study. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 462-7

An interlaboratory study involving protein efficiency ratio (PER), net protein ratio (NPR), relative NPR (RNPR) and relative nitrogen utilization (RNU) was carried out. Six collaborators assayed 6 samples, including casein plus methionine which was used as a reference protein. Collaborators prepared their own diets and analyzed the diets for nitrogen. Test proteins were added at the 8% level (N x 6.25). PER values varied more than NPR values which varied more than either RNPR or RNU. RNU and RNPR produced almost identical values, but RNPR remains the official method of choice, because it is a well established method. AA

2269 PARRISH (DB). Determination of vitamin E in foods: A review. *CRC Crit. Rev. Food Sci. Nutr.* 13(2); 1980; 161-87

Discusses : structures, chemistry and nomenclature of tocopherols; vitamin E standards and activities of tocopherols and tocotriends; review of methods; biological assays; physico-chemical methods (UV spectrophotometric and spectrofluorometric methods; colorimetric methods; other methods). chromatographic separations (column, TLC, paper chromatography, GLC, HPLC, automated methods); vitamin E content of foods (foods with natural vitamin E, foods fortified with vitamin E or having labeled vitamin E content, general considerations, sampling, saponification and extraction, separating contaminants and vitamin E-active constituents; detection and measurement; some typical methods used (AOAC, TLC, GLC, HPLC official, standard and tested methods) and recent developments. BSN

2270 SUKHATME (PV). Nutrition policy in the successive plant : A critique. *INSA Newslet.* No.62; 1980; 1-6

2271 HAENEL (H). Human nutrition: safety and risk. *Nahrung.* 24(4/5); 1980; 335-50

2272 SATTAR (A) and KHALID (ZM). Nutritional significance of dietary essential trace elements. *Food Sci + Technol.* 12(6); 1979; 303-7

Nutritional significance of dietary essential trace elements for human is discussed. Their biological roles and present position as food additives is briefly outlined. The losses and gains of essential elements in foods as a result of industrial and domestic processing treatments are reported. Classification of trace elements as to their recommended dietary allowances[5], and areas of research considered to be the most promising are described. AA

2273 BHAT (JV), GIRIJANAND BHAT and VIJAYALAKSHMI (HL). Ayurvedic approach to deitary needs of infants and children. *Arogya.* 6(2); 1980; 124-8

2274 TONTISIRIN (K), MOALEEKOONPAIROJ (B), DHANAMITTA (S) and VALYASEVI (A). Formulation of supplementary infant foods at the home and village level in thailand. *Food Nutr. Bull.* 3(3); 1981; 37-40

Seven supplementary infant food mixtures for infant were formulated with cereals, beans and groundnuts. Amino acid score of all the supplementary foods were estimated. Flow sheet for preparing supplementary food is given. BSN

2275 SWAMINATHAN (MS). Introducing nutritional considerations into agricultural and rural development. *Food Nutr. Bull.* 3(3); 1981; 30-6

TOXICOLOGY AND HYGIENE

2276 FOX (JG), THIBERT (P), ARNOLD (DL), KREWSKI (DR) and GRICE (HC). Toxicology studies. II. The laboratory animal. *Food Cosmet. Toxicol.* 17(6); 1979; 661-75

The laboratory animal can be thought of as the toxicologist's major instrument for use in a safety evaluation programme. Consequently, to obtain reliable results from such an 'instrument', the toxicologist must obtain animals of the highest quality available and maintain as well as monitor them in such a manner that intercurrent infections or latent disease do not produce effects leading to erroneous conclusions. The procedures described will enhance the reliability of the results obtained in toxicological studies. AA

2277 GRICE (HC). Toxicology testing. *Cereal Food World.* 25(10); 1980; 652-5

Methodology adopted for short term toxicity tests and chronic tests as adopted by the scientist in 1979 at a meeting in Hannover, Germany is detailed along with other aspects. KAR

2278 LANCETTE (GA) and HARMON (SM). Enumeration and confirmation of *Bacillus cereus* in foods: Collaborative study. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 581-6

A direct plating technique using mannitol-egg yolk-polymyxin agar and a most probable number (MPN) technique using trypticase-soy-polymyxin broth were compared for the enumeration of high and low populations of *B. cereus*, in mashed potatoes. These results suggest that the MPN technique is suitable for examining foods containing low populations of *B. cereus* but that the direct plating technique is preferable for foods that contain a high population of this organism. The confirmatory technique used in the proposed method is reliable for presumptive identification of isolates as *B. cereus*. AA

2279 SILLIKER (JH), GABIS (DA) and MAY (A). ICMSF methods studies. XI. Collaborative/comparative studies on determination of coliforms using the most probable number procedure. *J. Food Prot.* 42(8); 1979; 638-44

2280 STRINGER (MF), TURNBULL (PCB) and GILBERT (RJ). Application of serological typing to the investigation of outbreaks of *Clostridium perfringens* food poisoning, 1970-1978. *J. Hyg.* 84(3); 1980; 443-56

Five thousand five hundred and fifty four (77%) of 7245 strains of *C. perfringens* associated with the 561 outbreaks were typable with 75 Food Hygiene Laboratory antisera; in 354 (63%) of those outbreaks a specific serotype was established as being responsible for the outbreak. KAR

2281 EMSWILER-ROSE (BS), JOHNSTON (RW), HARRIS (ME) and LEE (WH). Rapid detection of *Staphylococcal thermonuclease* on casings of naturally contaminated fermented sausages. *Appl. Environ. Microbiol.* 40(1); 1980; 13-8

Staphylococcal food poisoning associated with fermented sausages has been a recurring problem. By testing for thermonuclease by direct application of sausage casing disks on the surface of thermonuclease assay agar plates, possible *Staphylococcus aureus* growth in fermented sausages could be detected simply and rapidly. Koupal-Deibel deoxyribonucleic acid agar was somewhat superior to toluidine blue deoxyribonucleic acid agar for thermonuclease assay of fermented

sausage casings. The sensitivity of the thermonuclease casing test was comparable to that of the extraction procedure and the thermonuclease casing test results were in complete agreement with the thermonuclease assay results by the extraction procedure. The thermonuclease casing test offers government and industry laboratories a useful screening tool which could significantly reduce the problem of *staphylococcal* enterotoxins in fermented sausages. AA

2282 EICHNER (M) and RENNER (R); Quick residue control of plant and animal food tobacco and tobacco products by sweep-co analysis. 2. *Z. Lebensmittel-Unters. Forsch.* 170(1); 1980; 1-4 (German)

The applications of herbicides in agriculture are very intensive. A great number of admitted compounds and their use require a consequent control of residues, especially in vegetables and fruits. The sweep-co-method for multiresidue analysis enables estimation of residues economically and conveniently. AA

2283 LEWERENZ (HJ), PLASS (R) and BLEYL (DWR). Studies on the coergism of selected pesticides. Part I. Acute oral toxicity of combined administration. *Nahrung.* 24(4/5); 1980; 463-9 (German)

Comparative studies with male rats were performed to investigate the coergism of single oral doses of selected pesticides, the comparison being based on the lethal effects observed. The quantitative analysis of the dose-mortality relationship and the determination of the coergistic index evidenced a slight increase of the lethal effect with lindane-phosmet and lindane carbaryl combinations. The combined administration of lindane and ethylenethiourea resulted in an additive lethal effect. AA

2284 ROSIVAL (L), SZOKOLAY (A) and UHNAK (J). Ecotoxicological studies on chlorinated pesticides. *Nahrung.* 24(4/5); 1980; 359-65 (German)

A model for the ecotoxicological investigation of pesticide residues has been described by analyzing various links of food chain and human materials. The possibility of studying the dynamics of the exposure to human beings is pointed out by analyzing gynaecological material (prenatal stage) and samples obtained at necropsy from human beings of varying age. The observations revealed a considerable accumulation of hexachlorobenzene which reaches the level of DDT. The conclusions drawn from ecotoxicological studies indicate that a reduction of the tolerances of pesticide residues in raw materials for baby foods is imperative. KMD

2285 LLEWELLYN (GC), JONES (HC), GATES (JE) and EADIE (T). Aflatoxigenic potential for *Aspergilli* on sucrose substrates. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 622-5

2286 HAYES (MA) and SCHIEFER (HB). Quantitative and morphological aspects of cutaneous irritation by trichothecane mycotoxins. *Food Cosmet. Toxicol.* 17(6); 1979; 611-21

Cutaneous responses of rats and rabbits to irritation with two trichothecane mycotoxins, viz. T-2 toxin and diacetoxyscirpenol (DAS) were assessed, and it was found that they could be used to measure, accurately and precisely, concentrations of T-2 toxin in the range of 5-60 µg/ml in a simple way. KMD

2287 TRENHOLM (HL), WARNER (R) and FARNWORTH (ER). Gas chromatographic detection of the mycotoxin zearalenone in blood serum. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 604-11

2288 COHEN (H) and LAPOINTE (MR). Sephadex LH-20 cleanup, high pressure liquid chromatographic assay, and fluorescence detection of zearalenone in animal feeds. *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 642-6

2289 REDDY (CS), CHAN (PK), HAYES (AW) and WILLIAMS (WL). Acute toxicity of patulin and its interaction with penicillic acid in dogs. *Food Cosmet. Toxicol.* 17(6); 1979; 605-9

2290 PILLAI (SC), SRIDHAR (MKC) and KASI VISWANATH (G). Fluorides and fluorosis. *Arogya.* 6(2); 1980; 100-7

Review discusses : flourides in water, foods, feeds and plant materials; toxicity; behaviour of rat incisors; effect in low concentrations; affinity for calcium phosphate; flouridation of water; type of food and food habits as a significant factor; and development of teeth and bone and role of flourine. BSN

2291 STUBBLEFIELD (RD). Stability and molar absorptivity of aflatoxin M1 in acetonitrile-benzene (1+9). *J. Assoc. Off. Anal. Chem.* 63(3); 1980; 634-6

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5.	Indian Information on Food Technology, 1966–69, 1971.		-do-
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